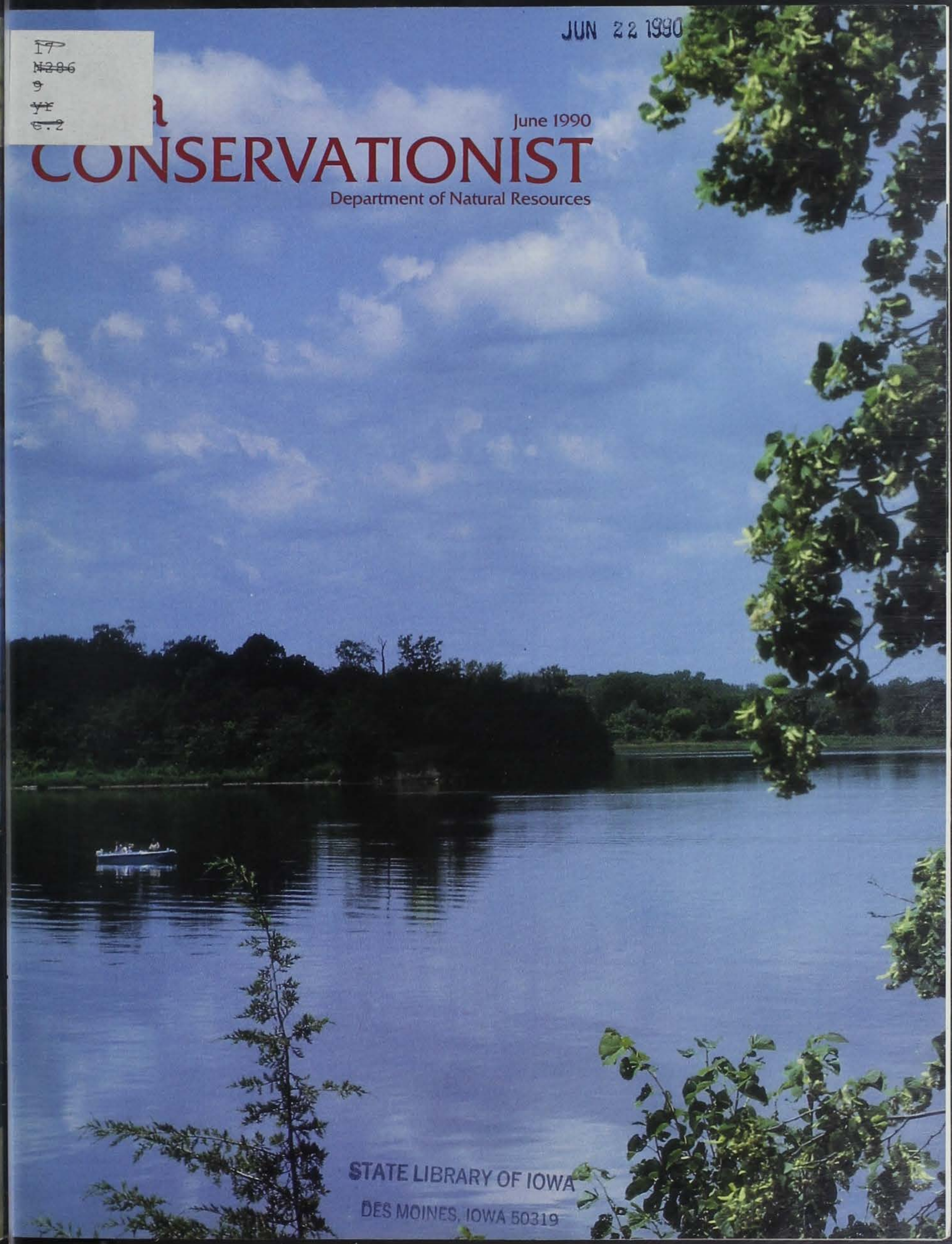
Iowa CONSERVATIONIST

June 1990

Department of Natural Resources



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COVERS: **Front** -- Boating on Big Creek. Photo by Ron Johnson. **Back** -- Eastern chipmunk. Photo by Roger Hill.

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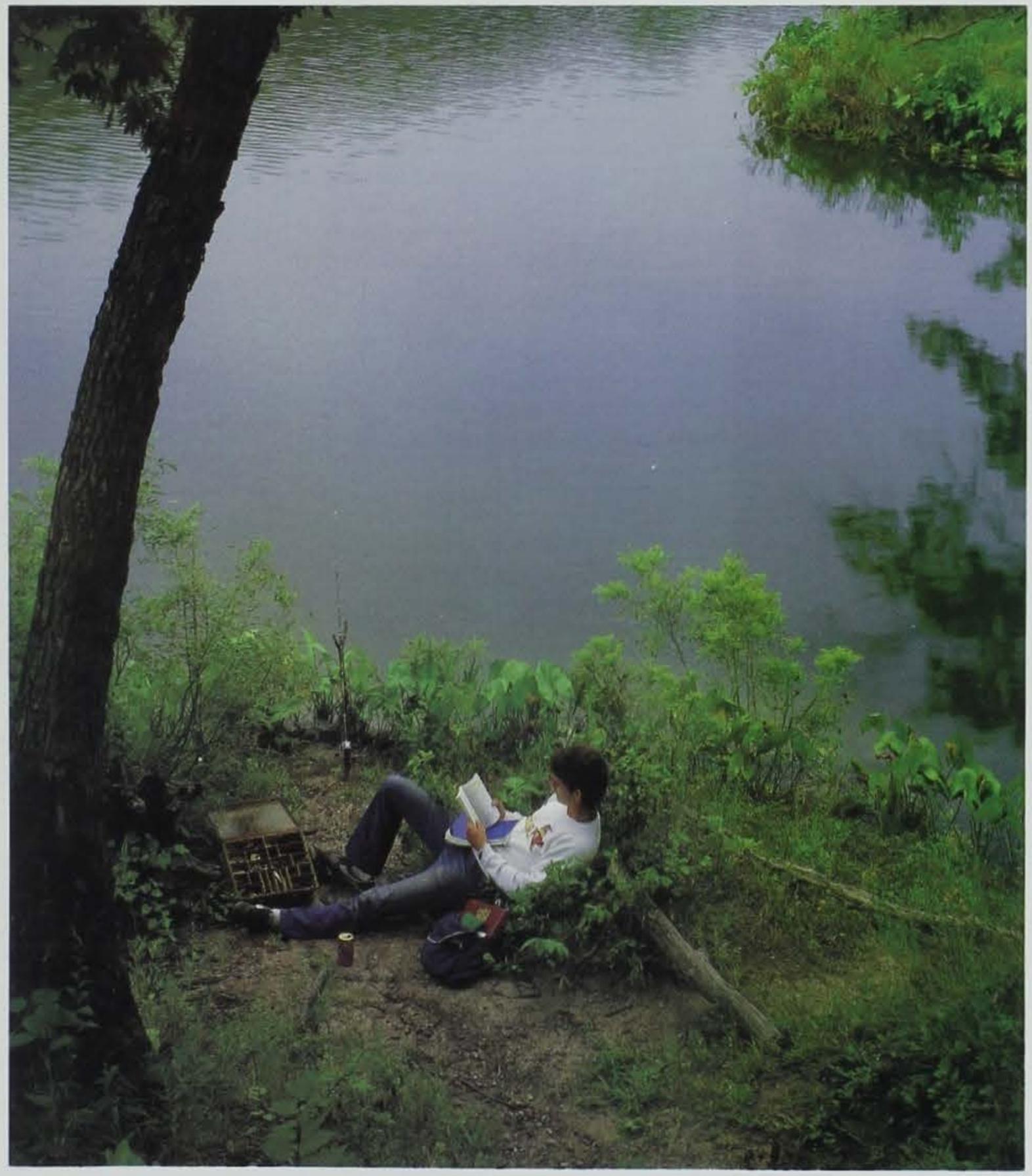


Still Fishing

A LOST ART

Article by Jim Wahl
Photos by Ron Johnson

Down to the local sandpit I went with my grandpa. I was toting my first fishing pole rigged with a #2 hook, split shot and a clip-on bobber. We selected a shady spot on shore and baited-up, with nightcrawlers dug following the previous evening's rain. I pushed the release on my Zebco 202 and slung my bait out as far as I could cast. The bobber quickly righted itself as I sat down to wait. I had done my part -- now it was up to the fish to cooperate.

For many anglers this is how we were introduced to the sport of fishing and, more specifically, to the technique referred to as "still" fishing. At the time I didn't care what it was called, to me it was just plain fishing. As my knowledge grew and my tackle box got heavier, I realized there were other techniques which included casting and jigging. Then my dad bought an aluminum fishing boat and I discovered there were even more possibilities which included trolling and drifting. The simple world of fishing that I knew as a youngster at the local pit had evolved into a complex sport and hobby. Unfortunately, as my knowledge and skills improved, I tended to overlook the very basic technique that originally got me "hooked" on this wonderful sport, and that was still fishing.

Today I have gone full circle and I am once again frequently applying the still fishing technique. In fact, I can't think of a more relaxing way to fish and if done properly, equally as effective.

There are some basics to still fishing which will improve your success. First, fish near cover, structure of wherever fish are likely to concentrate. Because the area of coverage is small, you need to put yourself in contact with the fish. In a lake situation this could be rock reef, prominent point, weed bed or transition area. Use contour maps and a depth sounder to help locate likely hot spots. In a stream, fish deep pools, back eddies or snags. These areas all provide food and cover, essential requirements which will concentrate fish. The haphazard approach suggested earlier generally provides little success.

Second, use live bait or other types of bait that attract fish by smell.

Still fishing is a very passive approach, and lively or scent-rich baits will trigger more strikes. If using minnows, do notcontinue to use a drowned one that hangs limp on the hook. The same holds true with leeches and nightcrawlers. One exception to this rule is with catfish -- they will readily take a dead bait.

Third, keep moving to different spots if you are not having success. I personally tend to be more patient than most. I'll sit on a spot for several hours if I have had success there earlier in the week and know fish are frequenting the area. But generally don't stay too long in a location where nothing is biting. Many anglers will use techniques mentioned earlier such as trolling or drifting to locate schools of active fish, then switch to still fishing.

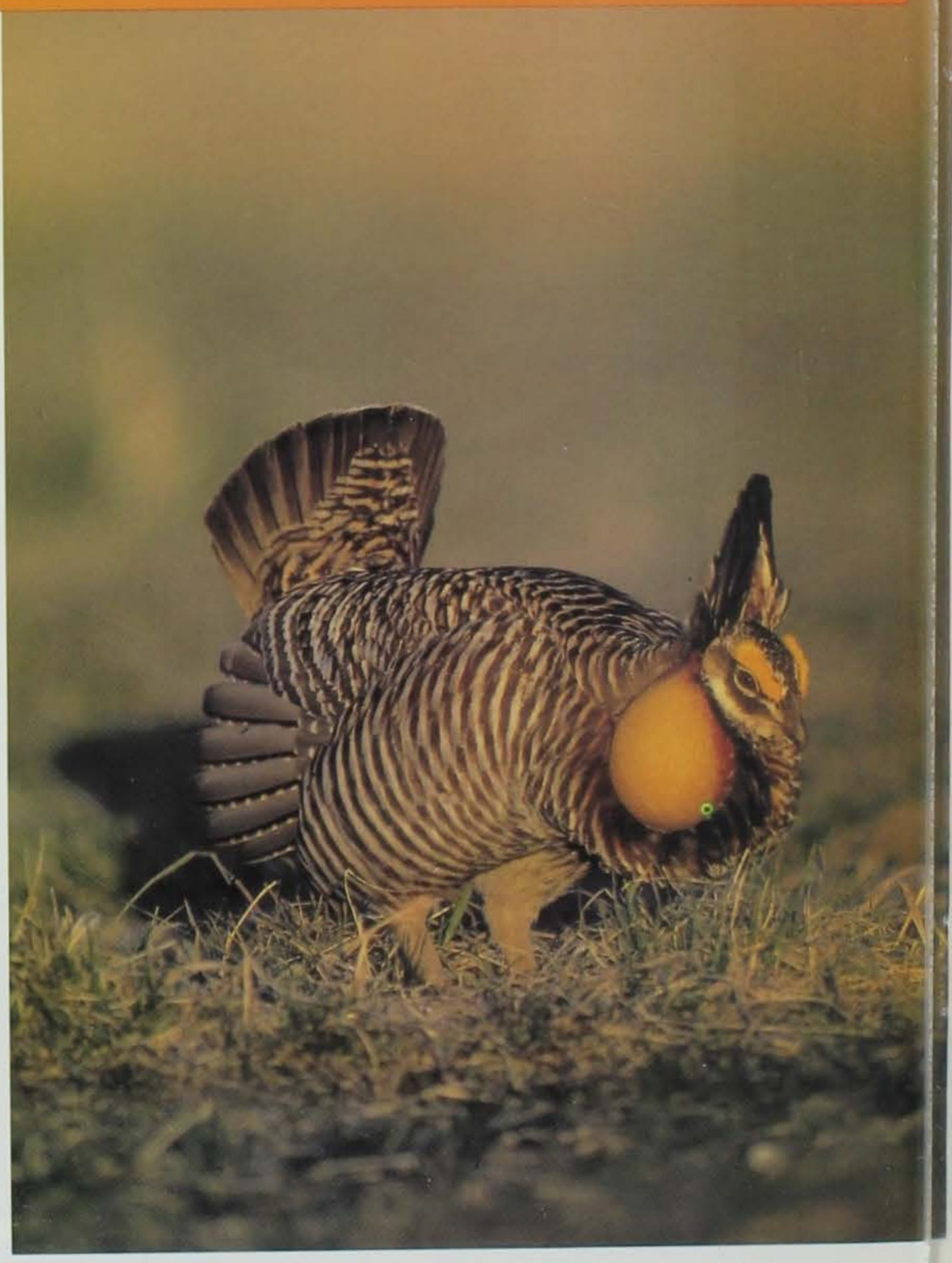
The equipment necessary to still fish is simple and inexpensive, which helps explain its popularity with novice anglers. Bottom rigs employ some type of weight or sinker and an attached hook. Tandem-hook rigs with two lines are a popular bottom rig with crappie anglers, because of their nature to suspend off the bottom. Slip-sinker rigs are effective for light-biting walleyes which avoid the resistance of a heavy sinker. Other types of bottom rigs include: spilt-shot rigs and river-rigs which use heavy sinkers to hold bait in strong current.

If you prefer to fish off the bottom, bobber rigs are more frequently used. Bobber or float fishing has become increasingly popular with the introduction of the slip-bobber. Slip-bobbers enable anglers to cast with ease and fish at much greater depths. Pencil bobbers are not as easy to cast or adjust, but are the most sensitive, making them popular when fishing in shallow water. Other types of bobber rigs include clip-on bobbers and lighted bobbers which provide an illuminated float at night.

Under the appropriate conditions still fishing will catch any sport fish that are found in Iowa. Don't be afraid to go back to the basics this summer. Drop the anchor in a likely spot, toss your line in and kick up your feet. But don't get too comfortable, you're likely to be too busy pulling in fish!

Jim Wahl is a fisheries management biologist for the department at Clear Lake.

They're Back



It was a still, frosty March morning as I stepped out of my car along a county road in southern Ringgold County. The air was filled with the sounds of booming, clucking and squawking as nine cock prairie chickens squabbled over choice portions of a nearby ridge that made up their booming or display ground. The noise level increased as two hens flew in from the west and landed on the periphery of the ground. Before morning was over, I would see a total of 21 prairie chickens including one more on another ground in Iowa and nine on a booming ground in nearby Harrison County, Missouri.

The sights and sounds I was witnessing that morning are the results of an ongoing program started in 1987 to reintroduce prairie chickens in southern Iowa. Originally the most abundant game bird in Iowa, prairie chickens disappeared from the state about 30 years ago. This program is an attempt to restore these natives in an area of Iowa that is still more than 60 percent grassland.

During the springs of 1987, 1988 and 1989, a total of 253 prairie chickens were stocked on the Ringgold Wildlife Area, just

Article by Mel Moe
Photos by Roger Hill

Iowa's lost prairie chicken population is on the verge of a comeback. The DNR hopes a reintroduced group of chickens in southern Iowa will keep the population booming.

north of the Missouri border, in Ringgold County. Birds used in this stocking were wild birds from Kansas obtained in a three-way trade in which Iowa sent turkeys and pheasants to Michigan and Michigan in turn supplied Kansas with geese in exchange for the prairie chickens. No birds were stocked in 1990, but populations will be monitored to determine if more stocking is needed in the future.

So far the results look promising. At least three broods were observed in 1989 and at least 25 males were found on four different booming grounds during the spring of 1990, a full year after the last birds were released. All of these numbers are minimal because it is very unlikely we would find all of the broods or booming grounds.

The fact that stocked birds have established themselves is not enough to guarantee the success of a reintroduction. Adequate habitat must be available to allow enough reproduction and survival to sustain bird numbers over time, and hopefully to allow the population to grow and expand. To help assure there will be adequate habitat, the Iowa Department of Natural Resources purchased 158 acres of grassland adjacent to the Ringgold Wildlife Area in 1988. This tract is being managed for prairie chickens with limited grazing, controlled burning, brush control and the removal of large trees that provide hunting perches for hawks and owls. Similar management, without the grazing, has been applied to an additional 450 acres of grassland on the Ringgold Wildlife Area.

With the above management, these grasslands are reverting to high quality prairie with a diversity of native grasses and forbs. This type of habitat benefits not only prairie chickens, but a host of other wildlife as well. Grassland birds that respond to this management include pheasants, quail, upland sandpipers, northern harriers and several grassland sparrows including the rare Henslow's sparrow. Mammals, such as least weasels and badgers, also benefit, as well as a variety of butterflies and moths.

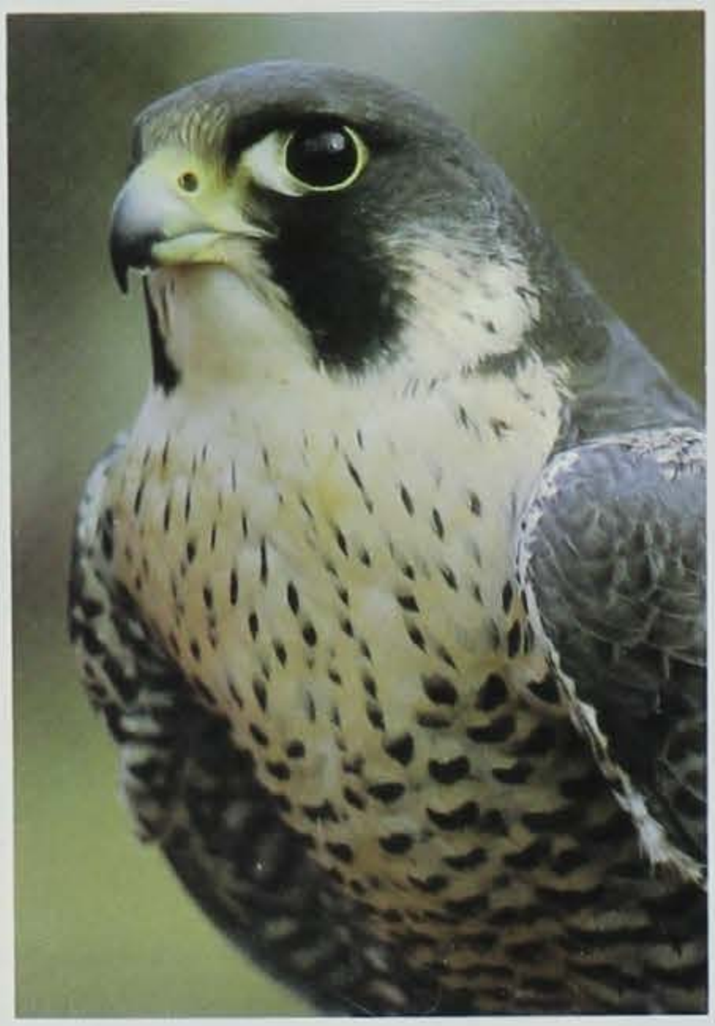
In summary, Iowa again has prairie chickens and the Department of Natural Resources, through its management programs, intends to insure they do not disappear again.

Mel Moe is a management biologist for the department at Mount Ayr.

Recovery 2000

Although not yet a reality, this joint effort of state and federal governments could help the Midwest recover and delist nearly two dozen threatened and endangered species in a little more than 10 years.

by Daryl Howell



DON POGGENSEE

Peregrine falcon

At one time, it was common to find species such as the peregrine falcon, bald eagle and prairie bush clover throughout the Midwest. But, because of loss of habitat, use of persistent pesticides such as DDT and indiscriminate killing, such species became threatened and endangered. Thanks to such efforts as Iowa's Nongame Program and the U.S. Fish and Wildlife Service's cost-share program with the states, progress has been made to recover threatened and endangered species. If the new Recovery 2000 program is implemented, it will expand existing efforts and greatly improve the chance to again enjoy several species presently listed as threatened or endangered on the national level.

Recovery 2000 is a cooperative federal and state effort, designed to identify threatened and endangered species which can be recovered by a 10-year action plan. Since the federal Endangered Species Act was passed in 1973, more than 530 species have been added to the national list. Nationally, five species have been recovered and delisted. Recovery is the improvement of the status of a species whithin a region and delisting occurs when a species is fully recovered in all its regions and is taken off the threatened and endangered species list.

Recovery 2000 is a pilot effort in the Midwest. Its goal is to recover, by the year 2000, 28 of the 41 threatened or endangered species found in the region, and to delist 20 of these species. Funding for the project, if approved, will be from the U.S. Fish and Wildlife Service and shared with the states and U.S. Forest Service.

While individual states have made considerable progress in recovering federal threatened and endangered species, Recovery 2000 recognizes that a regional effort can save time and dollars. Iowa is part of the U.S. Fish and Wildlife Service's Region 3, which also includes Minnesota, Wisconsin, Michigan, Ohio, Indiana, Illinois and Missouri. Recovery 2000 will focus recovery efforts on those species in Region 3 most likely to recover enough to be delisted. While this program will provide $12 million between 1990 and 2000, an overall savings will occur. It is more cost effective to concentrate activities on several species found in the same habitat than it is to spend money on individual species. Also, if a stable funding source is available, recovery of a species can take place in a shorter period of time. For example, the estimated cost for the first five years of the northern states' bald eagle recovery plan is more than $6 million. Through Recovery 2000, estimated cost is approximately $1 million -- a savings of $5 million. Such savings can be used for other species.

Recovery efforts in Iowa will be directed at such species as the peregrine falcon, Iowa Pleistocene land snail, western prairie fringed orchid, northern wild monkshood and prairie bush clover. These species have already been identified as those most likely to be recovered by the year 2000 -- provided adequate resources are available.

As of the 1988 breeding season, there were six pairs of successfully breeding peregrine falcons in the Midwest. The recovery objective for peregrines is to establish at least 40 territorial pairs (birds which may not be presently breeding but should within a year or two) by 1991 and to manage and monitor their status until 1998. The goal for Iowa is to have five territorial pairs in the state by the year 2000.

The Iowa Pleistocene land snail can be found on 29 sites in Iowa and Illinois. It is restricted to certain portions of "algific talus slopes" or cold-air slopes of northern Iowa and northwest Illinois. These slopes are developed over the entrances of caves and small openings, where air circulation and groundwater produce a constant flow of moist, cool air.

RON JOHNSON

The western prairie fringed orchid has been identified at 23 sites in Region 3, 13 of which are in Iowa. Fifteen of these regional sites are presently protected, and the recovery objective is to bring an additional 10 sites under protection. It is anticipated additional surveys will locate several new populations in Region 3.

The western prairie fringed orchid is generally found on virgin prairies. The species is threatened because the prairies have provided the Midwest with rich farmland, and consequently this species' habitat has been converted to agriculture. Iowa alone has lost more than 99 percent of its original prairie acreage.

Some of the research and management needs of the prairie fringed orchid include determining the effects of management burning, surveying suitable habitat for additional populations, and protecting populations through land acquisition and landowner cooperative agreements. Delisting will also depend on the success of recovery efforts in other regions.

The northern wild monkshood is a threatened plant which is found on shaded cliffs, cold-air slopes and near cold-water springs. All of these sites are characterized by a cold soil environment. Although the species occurs in Iowa, Ohio and Wisconsin, the amount of habitat for the species is locally restricted because of its unique requirements.

There are currently 89 known sites of northern wild monkshood. About 20 percent of the sites are protected. The recovery goal is to protect at least 50 percent of the known plants and their sites in Iowa, Ohio and Wisconsin. This will require an additional 10 to 20 areas be protected (several of these will be in Iowa), through acquisition and management agreements with private landowners.

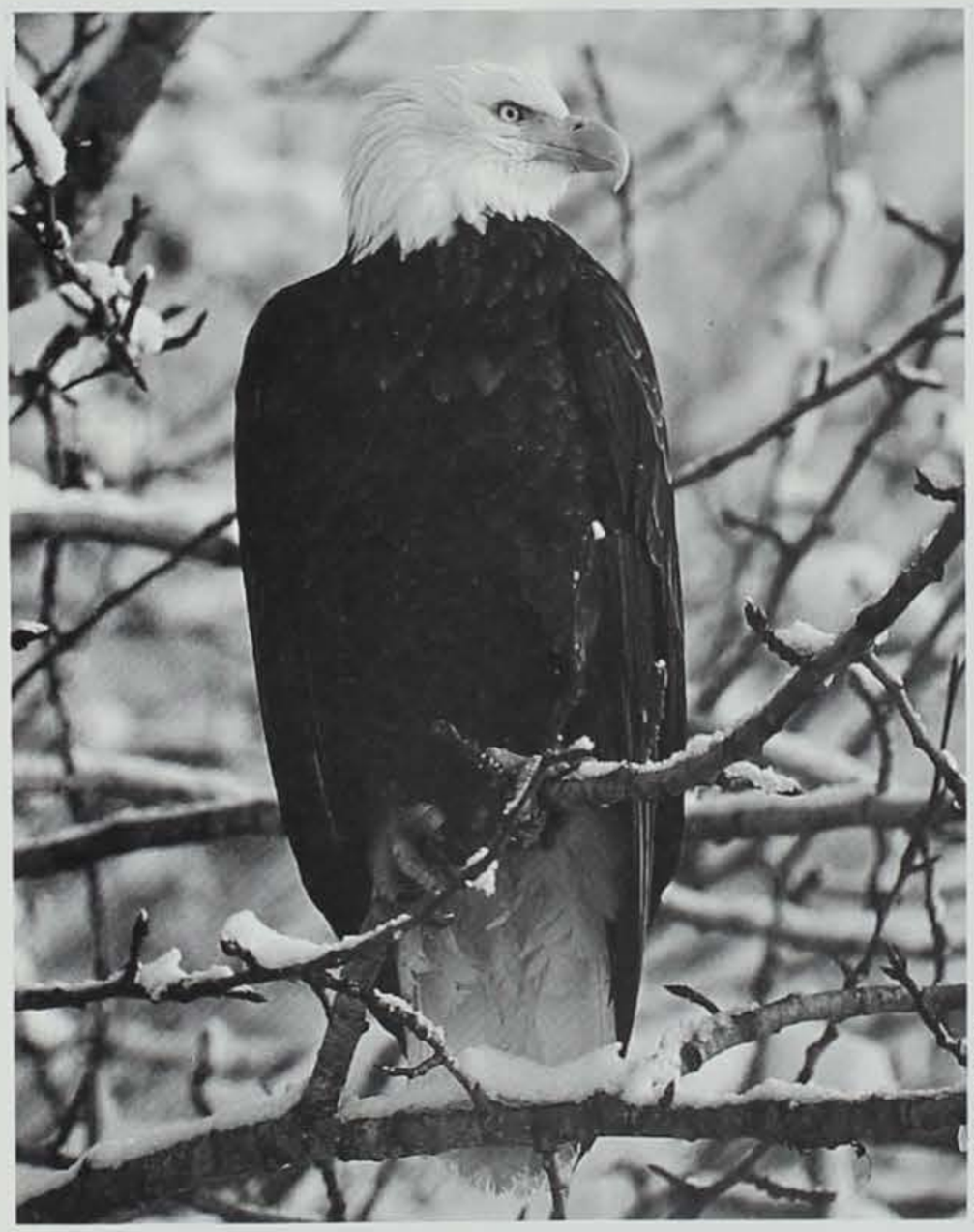
Fencing the habitat of northern wild monkshood to exclude livestock and periodically monitoring

MARK LEOSCHKE

KAY KLIER

The Iowa Pleistocene land snail (top left), the western prairie fringed orchid (top right) and the northern wild monkshood are threatened or endangered species in Iowa and scheduled to benefit from the new Recovery 2000 program.

MARK LEOSCHKE



DON POGGENSEE

The prairie bush clover (top) may not be as easily recognized as the bald eagle, but like the bald eagle it is on the threatened and endangered species list.

populations of the plant are some of the management needs of this species. Delisting could begin as early as 1993.

Prairie bush clover is a threatened plant that occurs on sloping, moderately dry prairies in Illinois, Iowa, Minnesota and Wisconsin. The species occurs at 38 sites, 11 of which are protected. At least 20 sites in northwest Iowa and southern Minnesota, and 15 other areas throughout the prairie bush clover range should be protected to recover this species.

Recovery 2000 is still not a reality. Although some money has been set aside for next year, to fully fund the program requires congressional action. The Iowa Department of Natural Resources and the other states in Region 3 are working closely with the U.S. Fish and Wildlife Service to get this important program started.

Why is it important to preserve endangered species?

The question often asked is "What use are these obscure plants and animals?" Some of the larger and more colorful species such as the peregrine falcon and the bald eagle, are a great enjoyment for many people, but other species, like the prairie bush clover, would be recognized by only a few botanists and naturalists. Why, then, should we be concerned about protecting endangered species, or for that matter any species?

Each plant and animal is unique because it represents potential solutions to many biological problems. Some of these solutions may be of use to us now or in the future. For example, several plant species have provided common medicines. Aspirin, which is derived from a species of willow, is one. Pain-killers like codeine and morphine are also of plant origin. Only a few plant species have been investigated for their use as medicines. Although drug companies generally produce medicines in the laboratory rather than by cultivating or collecting wild species, they must have the plants to first isolate and identify the necessary chemical compounds.

And individual species also contribute to the maintenance of other species, interacting within their common ecosystems. Thus, the loss of a species which appears to have little or no value to us may, in fact, cause the decline or loss of one or more species which we have already identified as important. Species for which we can find no particular importance today may be very important to us tomorrow.

Daryl Howell is chief of the department's preserves and ecological services bureau in Des Moines.

IOWA'S ANCIENT SEAS

Iowa forms the land-locked heartland of the United States, far removed from the oceans which border our nation. In fact, central Iowa lies some 900 miles from the Atlantic, 850 miles from the Gulf of Mexico, 1,400 miles from the Pacific and 900 miles from James Bay.

Therefore, it may come as a surprise that seas once covered our state, not once, but many times. The stack of sedimentary rocks found in Iowa reveals a record of deposition on ancient sea bottoms, and the contained fossils give exceptional evidence of the varied life forms that inhabited those seas.

The water in these seas was salty, and it flowed in from the open oceans which surrounded the North American continent. Unlike the ocean basins, the seas in Iowa were much shallower. Evidence for plant photosynthesis on the seafloor is common, suggesting depths less than the effective limits of light penetration through water, typically 500 feet or less. Geologists refer to such seas as "epicontinental," meaning "on the continent." Hudson Bay is an example of a modern epicontinental sea.

It is important to realize that, although Iowa presently lies at latitudes between about 41° and 43°N in a temperate climate, Iowa occupied a position at low latitudes, at times equatorial, between about 550 to 250 million years ago. This resulted from the migration, or drift, of the North American continent through time. Therefore, many of Iowa's ancient seas were characterized by relatively warm water in subtropical and tropical settings. Deposition of lime mud and shallow-water coral reefs today is limited to latitudes no higher than about 30° to 35°. The extensive record of limestone deposits in Iowa, including abundant corals, conjures up images of clear-water subtropical seas like those seen in the modern Bahamas. The rock record also displays details of wave and tidal currents washing the seafloor; deep, quiet bottom conditions occasionally disturbed by storms; arid coastal mudflats and humid coastal swamps and deltas; and even stagnant, oxygen-depleted masses of bottom water where organic matter was preserved. Most commonly, however, Iowa's seas consisted of well-circulated water of normal marine salinity in which a host of animals and plants flourished.

Iowa's sedimentary rocks contain an abundance of fossils, providing evidence of life forms that inhabited the ancient seas. The most abundant fossils are of organisms, most now long extinct, that lived on the sea bottom where they secreted shells or skeletons of lime and gleaned food particles from sea water or from bottom mud. Among the most important groups of these bottom-dwellers are the shelled brachiopods clams and snails, and the crinoids or "sea lilies." Colonial filter-feeding animals included corals, sponge-like stromatoporoids, and bryozoans, which sometimes formed reef-like communities. Soft-bodied worms burrowed through the sediments in search of food, and trilobites scavenged on the Paleozoic sea bottoms. Numerous swimming and floating creatures also inhabited the overlying waters. Microplankton formed the base of the food chain. Squid-like shelled cephalopods plied the waters of the Paleozioc and Mesozoic seas. By Devonian time, a variety of fish inhabited the seas of Iowa; most noteworthy were the armored placoderms and primitive sharks. The Cretaceous seas contained an impressive array of swimming predators, including large bony fish, advanced sharks and plesiosaurs, those large, fish-eating marine reptiles that lived at the same time as the dinosaurs. Plesiosaur bones have been found in Iowa near Sioux City.

Iowa seems relatively high-and-dry today, so how is it that seas migrated into Iowa in ancient times? The explanation lies in the consideration of two factors: 1) large-scale movements of the Earth's crust, and 2) relative changes in global sea level. Geologists have found that the crust of North America and other continents is not fixed, but is subjected to various stresses that create vertical motions in the crust. These uplifts or downwarps of the crust create flexures, mountains, sags and basins on the surface of the continent. If the crust is downwarped over a large region, the resulting depression or basin can be flooded by water from the surrounding ocean if the depression

by Brian J. Witzke

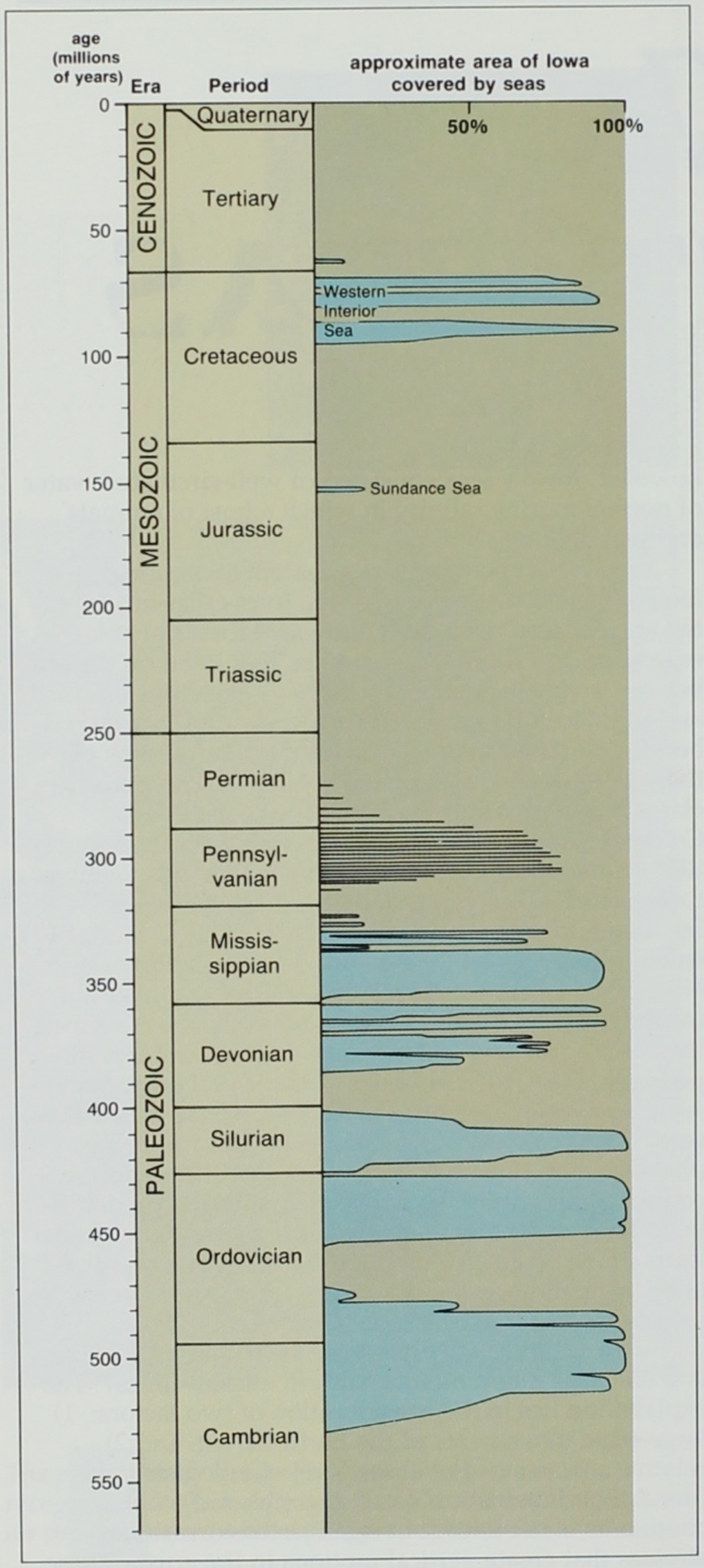


ILLUSTRATION BY PATRICIA J. LOHMANN

PAUL VANDORPE

A selection of fossil brachiopods, abundant bottom-dwelling marine organizms, collected from Devonian rocks of eastern Iowa.

UNIVERSITY OF IOWA

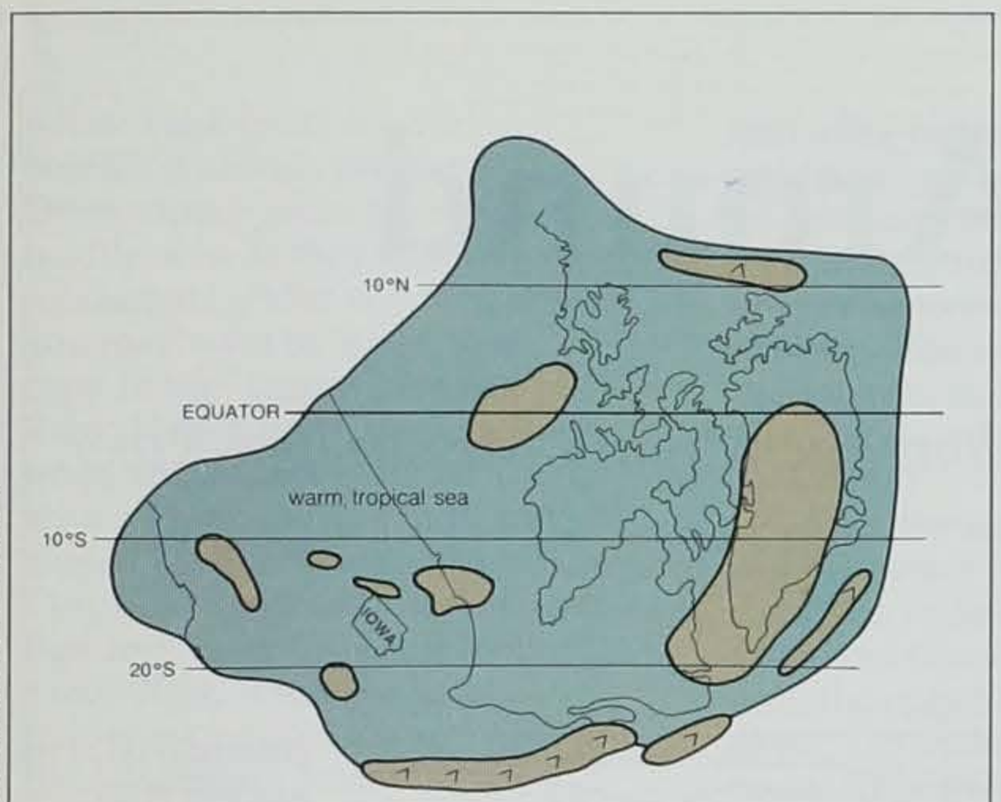
A fossil trilobite, with its typical three-lobed, oval-shaped external skeleton, from Ordovician strata in northeast Iowa.

lies below global sea level and there is some connection with the open ocean. As the seas advanced into Iowa, the eroded river valleys were flooded first forming estuaries, and, as the seas continued their advance, vast areas were progressively inundated, covering Iowa and much of the interior of the continent with sea water.

Crustal movements in the ocean basins, especially at the mid-ocean ridges, could displace large volumes of water, potentially raising sea level and flooding continental lowlands. Likewise, the waxing and waning of continental ice sheets significantly modify the volume of water in the oceans. For example, the melting of the North American and European continental glaciers, especially about 12,000 years ago, raised sea level approximately 300 to 400 feet, flooding large areas of former land.

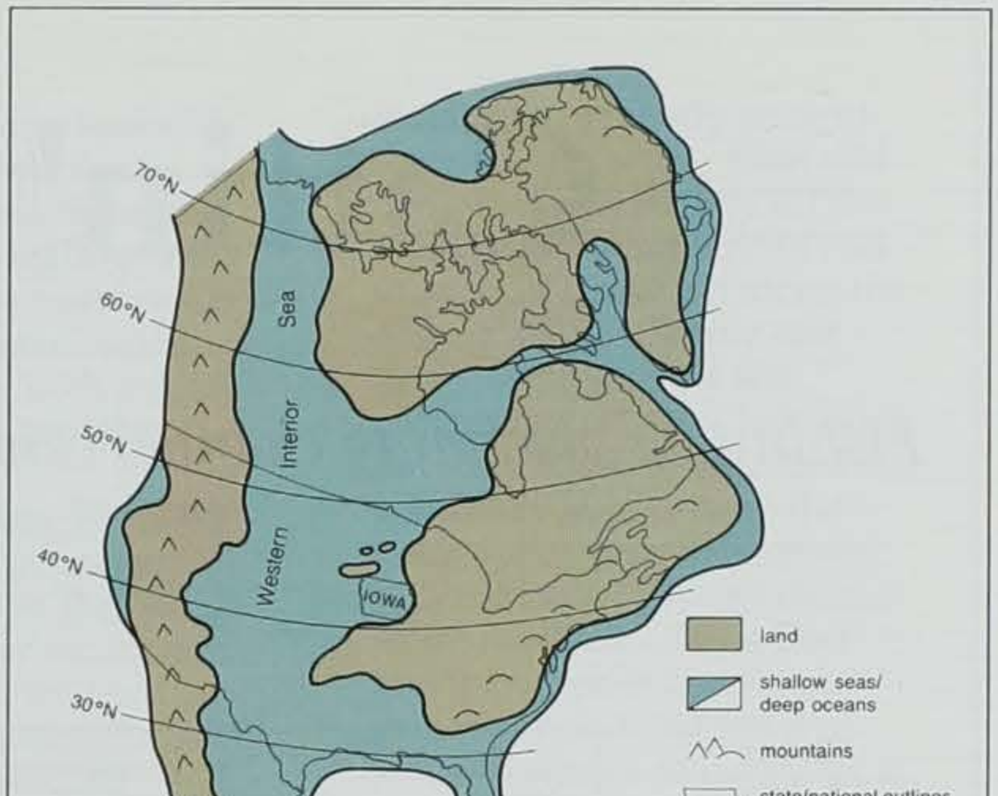
The record of ancient seas in Iowa dates back to when continental crust first formed the "basement" to what was to become the state of Iowa, beginning about 2.5 billion years ago. This Precambrian history is recorded by rocks now largely buried deep beneath the surface and spans the time from about 600 to 2,500 million years ago. Although this history has not been worked out in detail, various rocks in Iowa record the presence of shallow seas and volcanic islands fringing ancient ocean margins at that time. Sediments deposited in the ancient Precambrian seas include the distinctive pink quartzite seen at Gitchie Manitou State Preserve in northwest Iowa.

The better-known history of seas in Iowa begins in the Paleozoic Era, a time when the shells of sea-dwelling animals first became abundant. Trilobites thrived in the shallow, tropical Cambrian seas some 500 million years ago. These early marine deposits can be seen in the sandstone and limestone bluffs of northeast Iowa. The Ordovician seas also left a rich fossil record exposed in the limestones and shales of eastern Iowa. When the Ordovician seas withdrew, an eastward-draining network of valleys was eroded across eastern Iowa. Seas returned during the Silurian period (400-



LATE – ORDOVICIAN GEOGRAPHY
440 million years ago

ILLUSTRATION BY PATRICIA J. LOHMANN



LATE – CRETACEOUS GEOGRAPHY
90 million years ago

ILLUSTRATION BY PATRICIA J. LOHMANN

425 million years ago), when much of North America was covered by clear-water tropical and subtropical seas. Extensive deposits of lime-rich Silurian rocks can be seen at numerous localities in eastern Iowa. Large reef-like structures up to a mile in diameter grew at times in these warm seas. As the Silurian seas withdrew, eastern Iowa became a restricted embayment in which the familiar laminated building stone of the Anamosa-Stone City area was deposited.

Following an erosional episode lasting some 20 to 25 million years, seas once again flooded Iowa during the Middle Devonian, about 385 million years ago. At first the seaway was restricted in extent, and the water was characterized by high salinity and evaporation. Extensive deposits of gypsum salts formed at that time and now are an important economic resource for the state. Fluctuating sea levels during the remainder of the Devonian left deposits of fossiliferous limestone, shale and gypsum, as well as signs of surface erosion. Extensive deposition of lime also characterized the Mississippi seas, which covered much of Iowa about 330 to 360 million years ago. The bluffs and cliffs of fossiliferous limestone along the Mississippi River near Burlington and Keokuk form part of the classic geologic reference area from which the Mississippian Period derives its name.

The repeated rise and fall of sea level during the Pennsylvanian was caused by prolonged glacial activity in the southern hemisphere between about 275 and 350 million years ago. Iowa was flooded at least 45 times during this geologic period alone. These alternating episodes of marine and terrestrial deposition stacked seams of coal and layers of river mud between marine deposits of limestone and dark shale.

The record of Permian sedimentation has been lost to erosion in Iowa; however, the presence of marine limestones and shales of this age near the Iowa-Nebraska state line indicates that Permian seaways did expand into Iowa. There is no evidence that seaways encroached into Iowa during the latest Permian through early Mesozoic, from about 150 to 260 million years ago. It seems likely that Iowa was dry land during this time, experiencing a prolonged period of erosion as the continent migrated progressively northward across subtropical latitudes.

Economically important deposits of gypsum of Late Jurassic age occur around the Fort Dodge area, and were probably deposited in a marginal marine basin under arid climatic conditions. This area apparently occupied a position near the eastern margin of an extensive Late Jurassic seaway (the "Sundance Sea") that trended across the western U.S. and whose deposits are known from adjacent Nebraska. The extensive "Western Interior Sea" expanded eastward into Iowa during Cretaceous time beginning about 100 million years ago. The eastern margin of this seaway expanded and contracted several times during the Late Cretaceous, and marine shales and chalks remain as evidence of this last documented invasion of seas into Iowa. Evidence for the final influx of shallow seas into the central U.S. about 60 million years ago is found in adjacent South Dakota, where Early Tertiary marine shales occur. This sea may have extended into Iowa, but subsequent erosion has removed all deposits along what would have been the eastern margin of that sea.

The expansion and contraction of seas across central North America has a long and recurring history. It seems reasonable to suggest that these marine environments may one day, in the far distant future, return again to the heartland.

Reprint from Iowa Geology 1989, *Number 14.*

Brian J. Witzke is a geologist for the DNR's geological survey bureau in Iowa City.

Cattin' Around

Fishing for spawning channel cats along the Mighty Mississippi River.

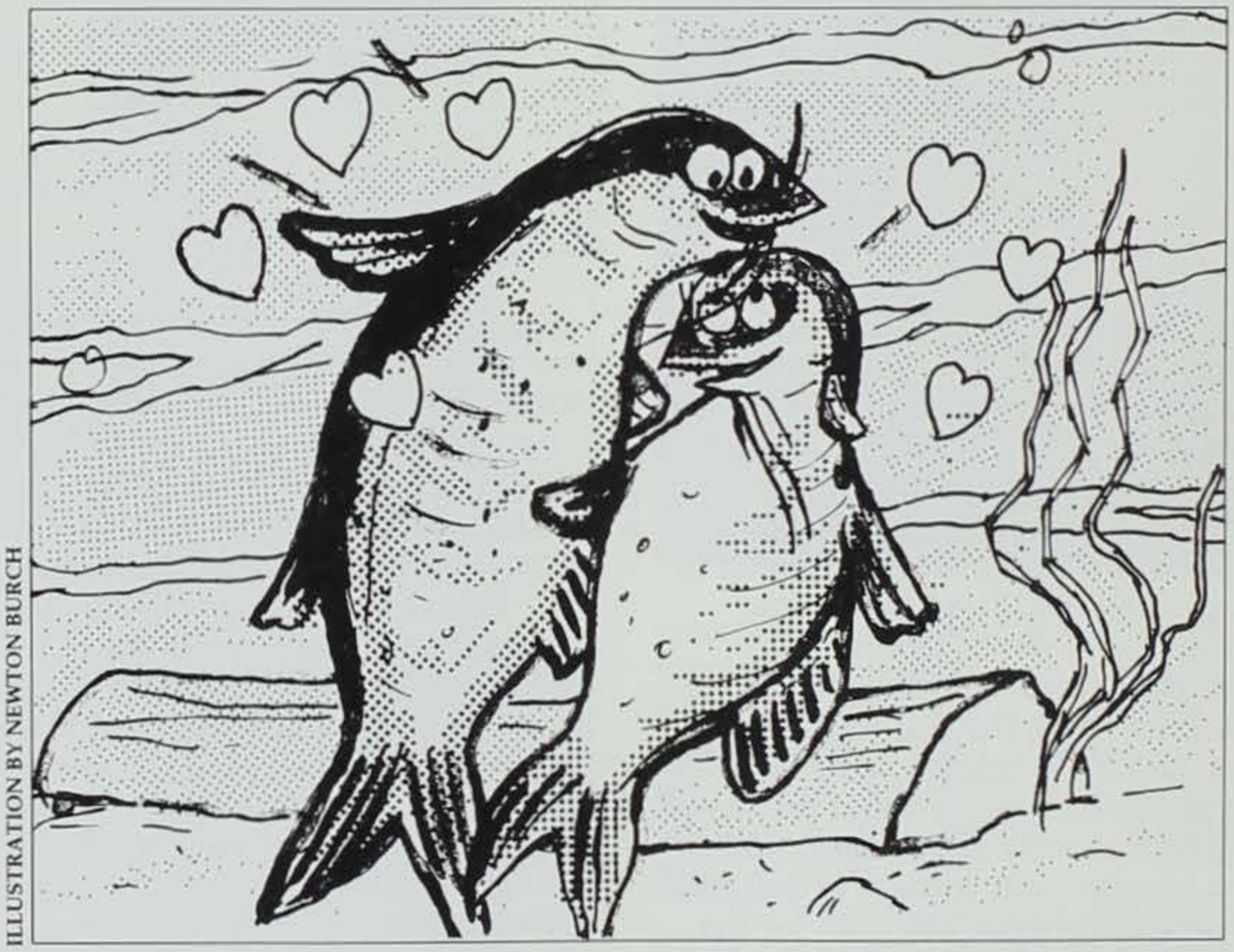


ILLUSTRATION BY NEWTON BURCH

Chuck stood firmly, back arched and muscles tensed, leaning hard into a bowed graphite salmon rod while a large fish raced downstream with the current, diving deeply into the river depths. The fight had just begun . . . it would be repeated 20 times in a day's outing catfishing spawners on the "Mighty Mississippi River."

Channel catfish get the primordial urge to recreate the species annually when the earth turns green, nights become warm and the water temperature reaches 69 degrees Fahrenheit, usually in late May or early June on the Mississippi. Old timers say cats begin spawning when you can smell the fragrance of wild grapes in bloom. It is a good omen and signals the time to begin fishing spawning channel cats.

Channel catfish seek specific habitats for spawning. Look for them in slow-moving current along the edge of banks at water depths up to six feet deep. The best spawning banks have lots of submerged habitat such as log piles, stumps, riprap, hollow logs, rock piles and other secret places where catfish can select depressions or cavities in which a nest can be constructed. Good spawning banks can be more than a mile long and are always well-known by commercial anglers who use slat nets to attract spawning catfish into a trap devised to imitate a spawning cavity. Riprap banks, especially those constructed of large boulders, also serve as premium spawning habitat for use by channel catfish. Crevices and cracks between large rocks provide spawning cavities for catfish.

Riprap banks are common along the river. Much thanks goes to the cautious and protective nature of construction engineers who amply provide for erosion control as they design and build projects. Riprap is used to protect railroad embankments along both sides of the river, navigation dams and wing dams taming and training the river for navigation, and the river's banks along outside river bends, upstream points, side channels, sloughs and chutes

by Gary Ackerman

where bank erosion could become a serious problem. Often, riprap areas are not readily seen as they may be submerged under water. Thus, you may want to invest in a copy of the "Upper Mississippi River Navigation Charts." These maps show most hidden riprap areas. These charts can be purchased for $12.50 from the U.S. Corps of Engineers, Clock Tower Building, Rock Island, Illinois 61204-2004. They are helpful guides for navigating and fishing the Mississippi River.

It is those riprap areas having large rocks and slow-moving current that are the better areas for fishing spawners. Many of these are well-kept secrets among anglers while others are fairly well known. The upstream dike at Lock and Dam 10 at Guttenberg, Iowa, has long been a productive riprap area for spawning cats. A relatively new bank fishery is Ackerman's Cut, located in Pool 11 just below Guttenberg. These are just a couple of examples to illustrate the qualities to seek when selecting a riprap area for catfishing. There are many fine areas for catfishing along the Mississippi River, they are just too numerous to mention. Anglers will need to do some exploration to seek out the better, more productive ones.

Channel catfish take little or no food while spawning. They gorge themselves prior to spawning, and about one month after spawning is completed, they again feed vigorously on just about anything organic. However, while spawning they dutifully protect their nest cavity and cluster of eggs. It is this protective instinct that makes them vulnerable to the angler when actively spawning. They will viciously strike at foreign objects which come too near their nest cavities. The most productive bait and probably the most threatening invader to spawning catfish, is a cluster of eight to 10 garden worms hooked once or twice through their midsection, wiggling and squirming to torment catfish into striking. You will take males and females as they both exhibit this aggressive and protective behavior.

After the eggs are fertilized and deposited in a gelatinous mass, the male drives the female away and takes over incubation until the eggs hatch in about 10 days. The male protects the nest cavity from predators and attends the incubating mass of eggs by continually fanning a slow flow of water over the eggs to keep them aerated and free from sediments until they hatch. The fry then disperse in schools to feed and grow to a new generation.

Old timers say cats begin spawning when you can smell the fragrance of wild grapes in bloom. It is a good omen and signals the time to begin fishing spawning channel cats.

While catfish are spawning, drift fishing over riprap areas is very productive. Catfish strike hard and quickly eject the wiggling mass of worms, thus it takes special equipment and skill to hook them.

Select a medium- or light-action salmon rod about seven feet long. Equip it with a good quality spinning or casting reel with a good drag system. Monofilament line in 12- to 14-pound test is sufficient for river fishing. You will need a float (bobber) to properly present the glob of worms. Float and drift your bait slightly off the bottom, bumping it from rock to rock, or drifting it along the edge of rocks. Simply cast upstream and allow the current to drift your bait along the edge of the rocks. And be absolutely sure to keep the slack out of your line for you will not have a second chance to set the hook. Buy a float about an inch in diameter, preferably one that has a wooden wedge to firmly fix it at a predetermined depth of about three to five feet. Paint it bright flourescent orange so it will be visible in dim light or amidst waves. All you need are several split shot to sink the bait, yet keep it lightly bouncing over the bottom. I prefer a #1 bait-holder type hook to hold the worms firmly. And keep the hook well sharpened, for it takes a hard thrust of the rod to firmly set the hook in the boney jaw of a catfish. The swiftness and strength necessary to set the hook is somewhat like bass fishing with surface lures, but you will have a whole lot more fight and fun in landing large channel catfish high tailing it south with the current.

If you want to catch unlimited quantities of lunker-size cats, escape to Iowa's mighty Mississippi River and its vast and varied resources. Fishing spawners off riprap is a short-lived and seasonal experience with almost unlimited opportunity in an immense resource. You cannot miss experiencing a quality outdoor adventure fishing spawning channel catfish.

Gary Ackerman is a fishery biologist for the department at Guttenberg.

The Civilian Conservation Corps Museum

by Jim Scheffler

On April 28, 1990, the Iowa Civilian Conservation Corps museum at Backbone State Park was formally dedicated. The museum tells the story of the CCC in Iowa. It is a story that needs telling. It is especially important for the young visitor to learn about the CCC, which may mean nothing more to them than a brief reference in a history book.

The CCC arose during one of the greatest crises which this country has faced -- the Great Depression of the 1930s. Within weeks of its establishment in 1933, thousands of young men were at work planting trees, building erosion-control structures and constructing facilities in national, state and city parks throughout America.

It is difficult to imagine such a program getting into operation so quickly today.

America was in an economic and social crisis. The CCC gave young men meaningful work, and, at the same time, addressed critical natural resource needs. Americans had, for many decades, exploited their natural resources. Forests were cut, waters were polluted and land was farmed until exhausted. By the turn of the century, natural resources were sorely depleted, especially in states such as Iowa where no federal or state parks existed. An awareness of the need to conserve natural resources was growing. The Iowa Board of Conservation was established in 1919 to develop a system of state parks and preserves -- to set aside areas of natural significance for use and enjoyment by present and future generations. Backbone, Iowa's first state park, was one of these.

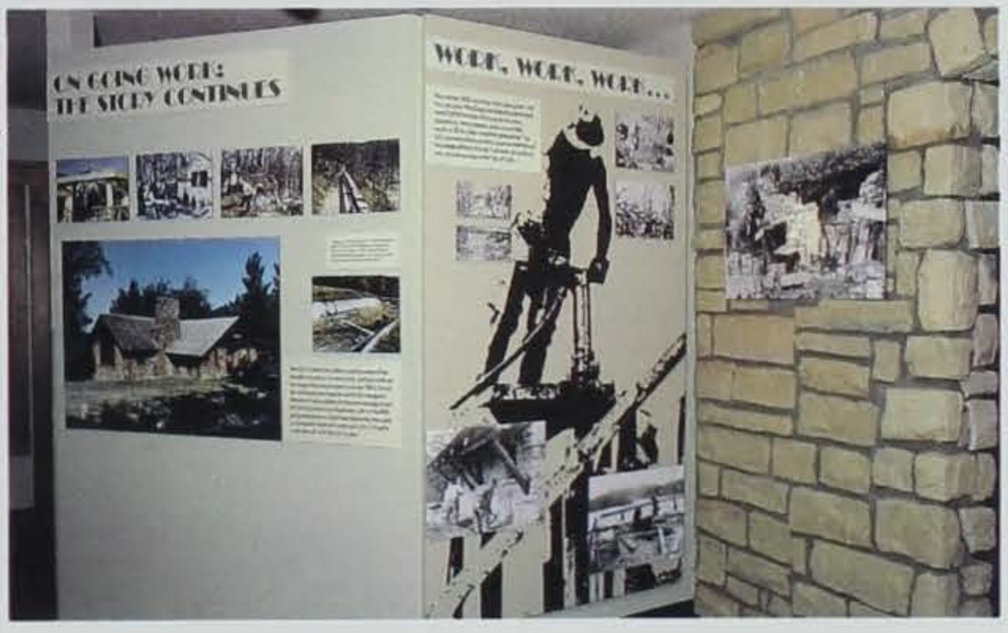
In the early 1930s the State Planning Board completed the Iowa 25-year conservation plan, a landmark document addressing the critical state of natural resources in Iowa and laying out a long-range plan of action. Establishment of the CCC by President Roosevelt was timely. Iowa had a plan in place so that when the CCC came to the state, work got underway

DNR PHOTO

RON JOHNSON

Shortly after the establishment of the Civilian Conservation Corps in 1933, men were at work planting trees, building erosion-control structures and constructing facilities in parks throughout America. A former staff residence at Backbone State Park (above left, circa 1920), was converted into Iowa's new CCC museum (above right). The museum tells the story of the CCC in Iowa.

RON JOHNSON



RON JOHNSON

RON JOHNSON

Every effort has been made, at the museum, to do justice to the CCC. The DNR worked closely with the Iowa Historical Society in securing a professional exhibit design. Other artifacts and materials will be added as they are acquired.

very rapidly on many important projects. The fledgling state park system grew tremendously as a result of the CCC. Work was done in more than 40 parks -- work which endures to this day.

The CCC was more than a "make-work" job program. The young men of the CCC gained important skills as well as pride and a work ethic that has carried on throughout their lives. Life in the CCC camps was, in many ways, an adventure -- a time looked back on fondly by CCC alumni.

The preparation of the museum was a long-term project by the DNR. There has long been interest by former members in developing a facility commemorating the achievements of the CCC. In 1987 the Legislature provided a special appropriation to get the project rolling. Every effort has been made to do justice to the subject -- to present the story of the CCC in interesting and effective ways. The DNR worked closely with the Iowa Historical Society in securing a professional exhibit "script" design and construction services for the museum.

Backbone is an appropriate place for the museum. It is Iowa's first state park and was the site of two CCC camps, as well as the location for the largest concentration of CCC facilities within the state park system. The museum is housed in a rustic, former staff residence, recently remodeled. It is located just inside the west park entrance.

The assistance of CCC alumni was crucial in the development of the exhibit script or "story" as well as in the securing of display materials and artifacts for the museum. The DNR intends for the museum to be a

Iowa State Parks With CCC Facilities

Lake Ahquabi	Palisades-Kepler
Backbone	Pammel
Beeds Lake	Pikes Peak
Bixby	Pikes Point
Black Hawk	Pillsbury Point
Brush Creek Canyon	Pilot Knob
Dolliver	Pine Lake
Echo Valley	Preparation Canyon
Fort Defiance	Red Haw
Lake Geode	Rice Lake
Gull Point	Springbrook
Lake Keomah	Stone
Lacey-Keosauqua	Lake of Three Fires
Ledges	Trapper's Bay
Lake Macbride	Twin Lakes
Maquoketa Caves	Wanata
Mini-Wakan	Lake Wapello
Okamanpedan	Waubonsie

PHOTOGRAPH COURTESY OF RICHARD H. BEIMER

CCC

The Civilian Conservation Corps at work in Iowa in the 1930s. More than a "make-work" job program, the CCC provided job training, housing and pay, which, more often than not, was sent back home.

PHOTOGRAPH COURTESY OF RICHARD H. BEIMER

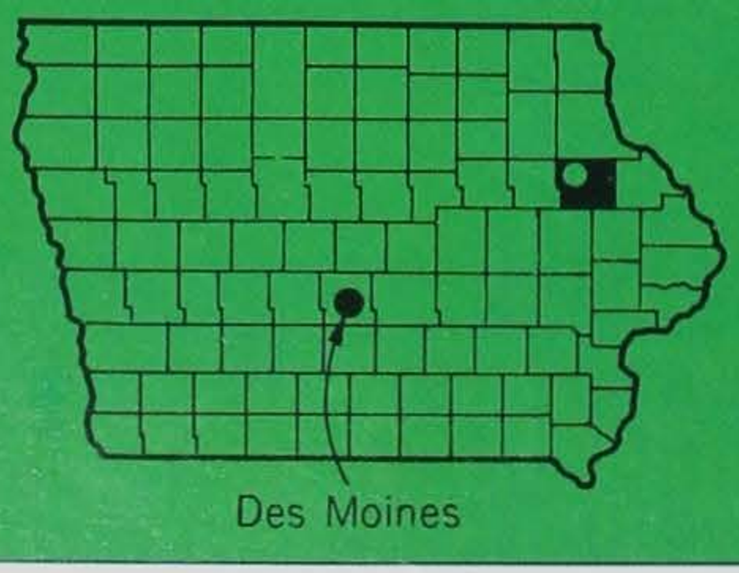
living resource -- to be refined as time goes on, through the addition of materials, artifacts and information.

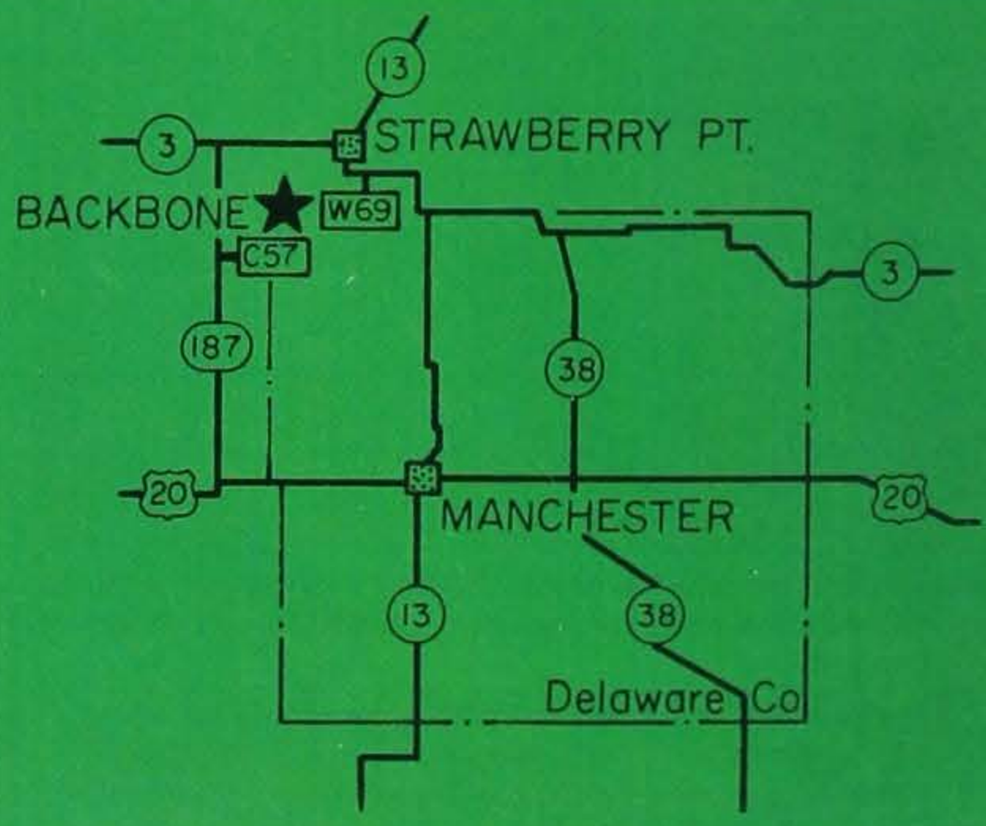
The DNR is working to continue the heritage of the CCC so that its splendid facilities may be available for use and enjoyment by future park visitors. A major emphasis has been placed on the renovation and repair of CCC facilities with park user permit monies and now, since 1989, funds supplied through the Resource Enhancement and Protection program. In order to assist the DNR in this effort, an intensive survey was made in 1989 of all CCC buildings and structures in state parks, forests, wildlife and fisheries areas. The purpose of the study was to carefully document all of these facilities to provide an information base for future management and renovation work. A number of significant groupings of CCC facilities or "districts" were identified and are now under consideration by the National Park Service for inclusion in the National Register of Historic Places. This is a prestigious honor reserved for only the most significant historical features.

Jim Scheffler is an assistant bureau chief for the DNR's park management bureau in Des Moines.

How to get there . . .

The CCC museum, located at Backbone State Park, is open from 11 a.m. to 5 p.m., Tuesday through Sunday, from May through October. The museum is open free of charge.





PHOTOGRAPH COURTESY OF RICHARD H. BEIMER

WARDEN'S DIARY

The Call to Tragedy by Chuck Humeston

RRRIIINNNGGG! The telephone screamed in my ear jolting me out of a sound sleep. It was almost exactly midnight.

I grabbed for the phone and croaked, "Hello?"

"This is the Sheriff's Department. We have a possible drowning. Could you bring your boat and help?"

I sat up awake, my stomach in a knot. Other officers had told me I would get one of these calls someday. Vainly, I hoped it would never happen.

Pulling on a uniform, I went to the garage, picking up the plain gray box containing drag hooks and a line. I backed up my car to my boat and headed to the call.

The area was already blocked off by police. Driving amid the flashing red and blue lights of police, sheriff and fire units, I could see a group of officers at the water's edge speaking with a group of young men dressed in cutoffs. The fire department's boat was already in the water. The roar of electric generators powering banks of floodlights seemed to add to the urgency of the situation.

The witnesses were in a state of shock. They had gone for a late-night swim. Their friend had simply slipped quietly under the surface of the water. No sound was made. No hint of danger. It happened close to shore. They pointed out the general area.

I backed up to the water. I noted a problem in my shifter cable. *How many times had I told my kids not to play with my boat*! I repaired the cable and made ready to start up the motor. I noticed the shaking in my hands, although the night was very warm.

A police officer jumped in the boat with me. The large treble hooks were attached to the drag line which we stretched between my boat and the fire department's boat.

We attempted to drag, but our motors were so large for this body of water that we covered area much too fast. Dragging in reverse overheated the motors. We resorted to rowing.

We rowed back and forth across the water in a pattern. The muscles in my arms tightened...effort or nerves? The other officers and I began to crack jokes. No, it was not funny. You have to be in the business to understand it. It's a defense mechanism covering a multitude of stress, enabling you to continue to do the job.

Other officers had told me I would get one of these calls someday. Vainly, I hoped it would never happen . . .

Giving up, we went to shore for coffee and donuts someone had brought. I slumped down against a fire truck and noticed the gathering crowd. What did they come to see? I've never figured it out. Curiosity? Mortality? I still don't know. Go to any accident, it's always the same. We returned to the boats. Unbelievably, we had been at it for almost four hours.

Recovering the same area we defer to a rescue squad of divers which had arrived. They disappear under the surface as we wait. I'm told the victim's parents have arrived, watching from shore for some time. I have children, and I think about them. Suddenly the water erupts as a diver surfaces. I know the search is over. He motions to me -- *No, why not the other boat?* I row over to him. The police officer reaches for the body, and we signal to clear the shoreline.

Gently and respectfully we take the victim to shore. I force myself to go through the motions. The sun is rising. As we wait for the ambulance, no words are spoken. What does one say? We are drained.

I returned home and headed for bed. I stopped and looked for a long time at my kids who were still asleep. Not even bothering to take off the uniform, I dropped into bed. Exhausted. Reports can wait. I closed my eyes; I could see the face. The tears flowed as the adrenaline slowed. I'm a cop, I'm not suppose to be affected by this. Why do these things happen?

Every officer has taken the verbal jabs as we admonish an unsafe swimmer or issue a citation for lack of life preservers. We ignore the jabs . . . because every officer has received the same call to tragedy.

CONSERVATION UPDATE

The "Prairie Pothole Joint Venture" -- It's Working for Ducks

by Neil Heiser, northwest regional supervisor, wildlife bureau

Over the past three years interest has been generated relating to improving record low waterfowl populations prevalent in the early to mid-1980s.

Continued and alarming wetland drainage in the U.S. and Canada, deterioration in upland nesting cover around remaining wetlands, coupled with drought conditions in the prairies of North America has brought about a cooperative effort by conservation organizations, governmental agencies and private individuals to bring back waterfowl through habitat enhancement.

Approximately $1.8 million per year is needed to meet Iowa's goal of acquiring 2,000 acres of waterfowl habitat each year through the year 2000.

This cooperative effort -- called the North American Waterfowl Managment Plan -- identifies key waterfowl habitat areas, sets goals to be achieved relative to waterfowl species numbers and habitat acres protected, and makes specific management recommendations. The year 2000 has been set as a target date for meeting these goals.

The Prairie Pothole Joint Venture -- PPJV -- is one of the major initiatives of the North American plan. It targets the protection and enhancement of 1.1 million acres of waterfowl breeding habitat on public and private lands by the year 2000. Iowa, which historically has been a part of the prairie pothole region of North America where a majority of waterfowl production occurs, is a part of this joint venture.

Within the glaciated pothole region of Iowa, approximately 98 percent of our original wetlands have been drained. Of those remaining, approximately two percent are lost each year.

Iowa's goals relating to the joint venture project are to protect 30,000 acres (2,000 acres per year for 15 years) of waterfowl habitat by acquisition, intensifying management for ducks on existing public lands, and encouraging landowners to restore drained wetlands on private lands. Funding to meet these goals is provided through a joint effort of the Iowa Department of Natural Resources and the U.S. Fish and Wildlife Service, private conservation organizations and individuals.

Thirty-five counties in northern Iowa are targeted to receive intensive efforts relating to the PPJV. This effort was divided equally between four counties with extensive habitat remaining -- Dickinson, Clay, Palo Alto and Emmet counties -- and 31 additional counties which together form the glaciated prairie pothole region.

Implementation of the PPJV began in 1987. Is it working?

Goals relating to the acquisition of 2,000 acres of waterfowl breeding habitat per year have been met during the last two years. To meet this goal, approximately $1.8 million per year is needed. Habitat targeted for the program includes existing wetlands, highly erosive cropland with restorable wetland basins, and needed nesting cover around existing public marshes. Emphasis has been placed on expanding existing wetland complexes, with particular emphasis on adding needed cover types adjacent to wetlands. These complexes produce more ducks than isolated marshes scattered over a wide area. As an example of how inadequate waterfowl nesting cover is adjacent to existing public wetlands, less than 14 percent of one state wildlife unit's waterfowl production areas met the minimum accepted acreage ratio of upland nesting cover to marsh.

By the end of 1989, 51 tracts of waterfowl habitat totaling approximately 5,280 acres had been acquired. Of this number 582 acres were existing wetlands, 692

acres were restorable basins and 4,006 acres were vital nesting cover adjacent to new or existing marshes.

A second area targeted by the Iowa PPJV involves restoration of wetlands on private lands. Private landowners and farmers have shown their concern and commitment to the importance of wetlands in northern Iowa. Marshes have been restored on federal conservation reserve acres, pastures, erosive cropland and odd areas in more than 40 Iowa counties by more than 200 landowners. Approximately 360 new or restored wetlands have been created by these property owners.

The third goal of Iowa's PPJV is to provide more intensive waterfowl production on existing state and federally managed waterfowl areas. In meeting this goal, more than 140 wetland basins have been constructed or restored on approximately 50 public areas. In addition, manipulation of water levels and improvement of control structures and dikes have been undertaken. Vital upland acreage has been seeded or improved to optimum waterfowl nesting cover. More than 1,000 artificial nesting structures have been maintained for waterfowl within the 35 PPJV counties.

Use by waterfowl of newly created wetlands and vegetative response to newly flooded basins is being monitored. During the 1989 breeding season, waterfowl counts conducted on Iowa's restored and existing wetlands showed breeding pair use, primarily mallards, blue-winged teal and wood ducks, to be as high or higher than those reported by other states and Canadian provinces within the prairie pothole region of North America. Overall, more than 150 wildlife species are benefiting from the PPJV project. This program also provides benefits such as increased recreational and economic potential, improved water quality, reduced soil erosion, better flood-water control and recharged groundwater sources.

More than 500 new wetlands have been created on public and private lands. With the advent of replenishing spring rains, these basins and existing marshes will raise large numbers of waterfowl and other wildlife.

The commitment by the Prairie Pothole Joint Venture is long-term. The accomplishments to date must be continued. Landowners, conservation organizations and county, state and federal governments must continue working together toward the goals of the North American Waterfowl Plan. Private landowners must be given economic incentives to restore and maintain wetlands. And, all Iowa citizens need to financially support the objectives of improving this state's wetland base.

DNR Publications

New and recently revised publications of the Iowa Department of Natural Resources are listed below. This listing will appear periodically as additional publications are completed. These publications are free unless otherwise noted ($). We reserve the right to limit quantities. To request copies, write the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

Composting -- A Guide for Composting Your Yard Waste in a Holding Bin (Revised; large-format brochure detailing steps for constructing and using a compost pile.)

Global Climate Change -- Implications for Energy Policy in Iowa (Reprint; 16-page booklet on global warming -- the causes and how it will impact Iowa.)

Groundwater Primer for Iowa Issues (Revised; formerly available only to teachers, now available to the public; 24-page booklet on Iowa's groundwater quality and sources of groundwater contamination.)

Hazardous Chemicals In Our Homes (New: one-page flyer lists household hazardous materials and possible alternatives as well as disposal methods for hazardous materials.)

Iowa State Park Brochures (Revised; brochures on each state park; contact the individual park or write the above address after June 15.)

Iowa's Environmental Update (Revised; formerly entitled *Groundwater Protection News*; bi-monthly newsletter.)

Mississippi River Recreational Boating Guide (New; 12 individual brochures and folder covering 11 pools along the Iowa portion of the Mississippi River; available late June.)

Office Wastepaper Recycling (New; one-page brochure on how to start an office recycling program at work.)

Trees For Iowa Today and Tomorrow (New; one-page, full-color brochure on benefits of planting trees.)

Waste Management In Iowa -- Preparing For The Future (New: one-page brochure describing the functions of the Waste Management Authority Division of the DNR.)

Upcoming NRC, EPC and Preserves Board Meetings

The dates and locations have been set for the following meetings of the Natural Resource Commission, Environmental Protection Commission and the Preserves Advisory Board of the Iowa Department of Natural Resources.

Agendas for these meetings are set approximately 10 days prior to the scheduled date of the meeting.

For additional information, write or call the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

Natural Resource Commission:
--July 12, Estherville
--Aug. 2, Clear Lake
--Sept. 6, Missouri Valley

Environmental Protection Commission:
--July 16-17, Des Moines
-- Aug. 20-21, Des Moines
--Sept. 17-18, Des Moines

State Preserves Advisory Board:
--June 12, Dolliver State Park, Lehigh

Fall Turkey Harvest Record Broken

Despite reduced turkey production last summer, Iowa turkey hunters set another record harvest last fall, bagging 5,212 wild turkeys for a 22 percent increase over the fall 1988 harvest.

A record 13,833 shotgun licenses were issued for the Oct. 9 through Nov. 26 season. Nearly 44 percent of the shotgun licenses were issued free to landowners. An additional 1,022 archery-only licenses were issued for a season that ran from Oct. 1 through Dec. 1, and Dec. 18 through Jan. 10. Bow hunters harvested 66 wild turkeys during their season.

The fall turkey season was the first season where non-residents were allowed to hunt. Although 500 licenses were available, only 157 were sold to hunters in 13 different states. Non-resident hunters harvested an estimated 67 wild turkeys.

"Although we issued 37 percent more licenses this fall than in 1988, I expected, because of the summer turkey brood survey, the 1989 fall harvest would be similar to the 1988 season. I was surprised hunters set another record," said DeWaine Jackson, forest game research biologist for the Iowa Department of Natural Resources.

"Based on previous research in southern Iowa, a higher percentage of adult hens are harvested in fall hunts of years with poor production versus higher harvest in years of good production. I believe the summer brood survey was accurate, and what we are seeing with the record harvest is an increase in licenses, an increase in hunter numbers and a shifting of hunter pressure to adult hens that compensated for the reduced production," said Jackson.

Although 13,833 shotgun licenses were issued, only 10,562 hunters actually hunted turkeys last fall. Nearly one out of every two active hunters harvested a turkey. Hunter success rates ranged from 22 percent for zone one (Stephens State Forest) to a high of 68 percent for zone two (Shimek State Forest). At least one turkey was harvested in each of 49 counties. The leading turkey harvest counties were Allamakee, Clayton and Van Buren.

Applications for the fall 1990 turkey season will be available later this month.

Free Fishing Days In Iowa and Missouri

Sport fishing license requirements have been waived in Iowa and Missouri to help promote National Fishing Week, June 4-10, 1990.

In Iowa, no license is required of residents for fishing June 8-10, 1990.

In Missouri, no license is required of residents or non-residents for fishing June 9-10, 1990.

All laws regarding size and bag limits and other fishing regulations must be followed. Anglers should obtain copies of each state's fishing regulations for further information.

Boating Accidents Increased Slightly During 1989

Iowa boaters were involved in 49 accidents in 1989, resulting in 27 personal injuries and five fatalities. Property losses exceeded $150,000.

This is an increase from 1988 statistics when there were 44 reported accidents, resulting in 24 personal injuries and eight deaths.

Iowa's lakes and reservoirs proved to be the most dangerous, accounting for 29 accidents. Iowa's inland and border rivers accounted for 20 accidents. Types of accidents included three vessels capsizing, five people falling overboard, four vessels colliding with fixed objects, five water skiing mishaps, 17 boats colliding with other vessels and four fires on board.

According to Sonny Satre, recreational safety coordinator for the DNR, almost all of the accidents could have been prevented by using common sense and by following simple navigational rules. According to Satre, causes of accidents included overloading, rough or hazardous water conditions, an improper outlook, operator negligence, excessive speed, faulty equipment and alcohol use.

Satre urged boaters to be familiar with Iowa's boating regulations. To avoid collisions, boaters should be knowledgeable of right of way rules and speed and distance regulations. Boaters may obtain a copy of the Iowa Boating Regulations brochure from county recorder offices or by writing the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

The DNR has developed a home-study boating course which is ideal for ages 12 and older. Those who successfully complete the course will receive a boating patch and certificate from the DNR. Successful students may also receive a discount on their boating insurance from several companies.

Enter Potential Record Fish in Iowa's "Big Fish Registry"

Anglers are reminded to enter any large fish, as well as released fish, caught in Iowa in the Department of Natural Resources' "Big Fish Records Registry." Fish meeting minimum weight or length requirements are eligible for entry, and anglers will receive a shoulder patch and certificate.

Extra care should be given to possible new state record fish. "Lack of knowledge about the state records program often spells the difference between a new record and just another big fish," said Marion Conover, fisheries management supervisor for the DNR. "Sometimes several hours or even days go by between the time a fish is caught and the time it's officially weighed. In some cases, this doesn't make much difference, but under certain conditions, a fish will lose a substantial amount of weight."

The official rules for submitting potential record fish and large fish are as follows:

- The fish must have been legally caught in Iowa's public fishing waters.
- New all-time record fish must be examined and verified by DNR personnel.
- One witness must attest to the length or weight of the fish to the nearest ounce on scales legal for trade. Length is measured from the tip of the snout to the tip of the tail (total length).

If there is some doubt in species identification, the angler should contact the nearest DNR fisheries representative in the area for verification.

An entry blank, found in the *1990 Iowa Fishing Regulations* brochure, should be completed and mailed with a color slide or photo to *Fish Records*, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034. The deadline for entry in the 1990 records is Jan. 15, 1991.

The top 10 fish caught and the released of each species, as well as the all-time record fish, will be published in a spring issue of the *Iowa Conservationist*.

June Is Rivers Month

To help promote the importance of Iowa's rivers, Governor Branstad has designated June 1990 as "Iowa Rivers Month.'

This is the ninth year the value of rivers has been officially recognized in Iowa and across the nation. Proclaiming June as Rivers Month coincides with American Rivers Month where river-related activities and celebrations are held across the United States, bringing the importance of rivers to the forefront.

During the month, the Office of the Governor, the Department of Natural Resources and the Louisa County Conservation Board will co-sponsor the "Governor's Invitational Canoe Trip." The canoe trip gives Iowa's decision-makers at the state, county and municipal levels the opportunity to personally experience the sceinic and recreational qualities Iowa's rivers provide.

COUNTY CONSERVATION BOARD FEATURE

Sloshing Through the Marsh . . . . . and Other Outdoor Adventures

by Cele Burnett

The kids and their leader grab hands and stretch out in a line. "We're at the edge of the prairie marsh now," their leader says. "What do you see?"

"A black bird with a yellow head sitting on some tall grass."

"The grass bending in the wind."

"There aren't any trees."

"Glaciers once covered this part of the country," their leader says. "They started to melt when the climate changed more than 10,000 years ago. They moved back up north. The land left behind was flat, and it was soon covered with prairie grasses -- except where big chunks of ice broke off from the main glacier. When the ice chunks melted, they left low places which filled in with water. These are called potholes. Marsh grasses grow in these wet places.

"So this is the prairie marsh -- a pothole in the prairie. Do you see that patch of dark green plants over there?" The kids' eyes follow the pointing finger of their leader. "Let's go see why there's a different kind of grass growing there."

They gamely plunge through the prairie grass that reaches their waists and higher. It isn't long before they splash up to their ankles in murky water.

"Hey, it's wet!"

"Yuck!"

"It's cold!"

They reach down to grab a handful of black "ooze" from under the water. They smell it.

BRUCE MORRISON

"It stinks."

"Why?"

"It's dead stuff rotting away."

They poke their fingers around in it and squeeze it through their hands.

"It's slimy."

"Look at the tiny red worms!"

Someone disturbs a crayfish, and it scurries off to hide under some vegetation.

"What do the tiny red worms eat? And what eats them? What does the crayfish eat, and what eats the crayfish?"

"Tiny bugs."

"Different kinds of bugs."

"Birds."

"Raccoons."

They run their fingers along the rough edges of the tall grasses growing in the water.

"It hurts."

"It cut my finger."

"What should we call this grass?"

"Knife grass."

"Sandpaper grass."

"Saw grass."

"Why does the grass have rough edges?"

"So it won't get eaten."

"I wouldn't eat it. It would cut your tongue."

They explore the marsh, a very special place that's home to more plants and animals than they imagined. And, these nine-year-old kids discover ideas about food chains and competition, about communities and habitat, about consumers and producers, without dull lectures and without memorizing textbooks.

The goal is not to remember the name of a wild plant, but rather to remember its fragrance, the texture of its leaves, where to find it, what lives in its community. Outdoor adventures like this are ways to absorb the various moods of the outdoors by wandering off a forest trail at night or into a prairie during a rain-shower or along a lakeshore at sunset. They give people a new vantage point from which to observe nature, whether from a tree house, a platform on stilts over a prairie, or on a raft that floats on the water.

Today, we have cut ourselves off from nature, watching it, but

JERRY LEONARD

Experiencing nature first hand, such as catching a crayfish and seeing its mud "nest," adds relevance to lessons taught in the classroom and from the textbook.

JERRY LEONARD

separate from it. We are viewers rather than participants. But these lesson plans plunge the kids directly into nature.

It's a way to heighten their senses, by holding their noses, covering their eyes and plugging their ears. They may role-play as frogs, raccoons, fish and dead logs. They soon learn there are no labels, no right or wrong answers in the outdoors, only questions in response to questions -- questions which demand thoughtful responses.

"Look at the leaves on this plant. They're fuzzy!"

"What's it called?"

"What does it feel like? Look like? What would you call it? Why does it live here? Could it live in the wet places?"

The products of such a program are excitement, enthusiasm, dedication and innovation. The rewards are seeing the science of ecology removed from the world of the textbook and the classroom to become a meaningful and natural commitment in the lives of these young people.

That's what these programs are all about -- an intimate understanding of nature and its systems and cycles, a realization of humanity's role as chief predator of the earth, a motivation to try to salvage what we can of our natural heritage.

But ask the kids in the marsh what they think of it.

"I liked standing in the water with my feet wet, like the marsh plants."

"I want to be a crayfish and hide from everybody in the mud."

"I want to be saw grass so nobody would eat me."

"Can we get wet tomorrow?"

Cele Burnett is a naturalist with the Story County Conservation Board.

CALENDAR

JUNE 8-10

Lewis and Clark Festival. Lewis and Clark State Park is the location for early 1800s trades, foods, crafts, history and games. Also, demonstrations of the keelboat, "Discovery." For more information, contact Ron Williams, Lewis and Clark State Park, Onawa, Iowa 51040, (712)423-2829.

JUNE 10-16

State Park Week. Special events, including interpretive activities, fishing contests, movies and drawings for prizes at individual state parks. Also, pay for six nights of camping and receive the seventh night free. Register at any state park to win 30 days of free camping (20 names will be drawn). For more information, contact individual state parks.

JULY 4

Fourth of July Celebration. Fireworks at Red Haw State Park, Lucas County. For more information, contact Bob Schierbaum, Red Haw State Park, Rte. 1, Box 212, Chariton, Iowa 50449, (515)774-5632.

JULY 7-8

Wapsipinicon Rendezvous. Buckskinners, craft demonstrations, pistol shoot, knife throw and craft demonstrations at Wapsipinicon State Park, Jones County. For more information, contact Mike Brewer, Wapsipinicon State Park, Rte. 2, Anamosa, Iowa 52205, (319)462-2761.

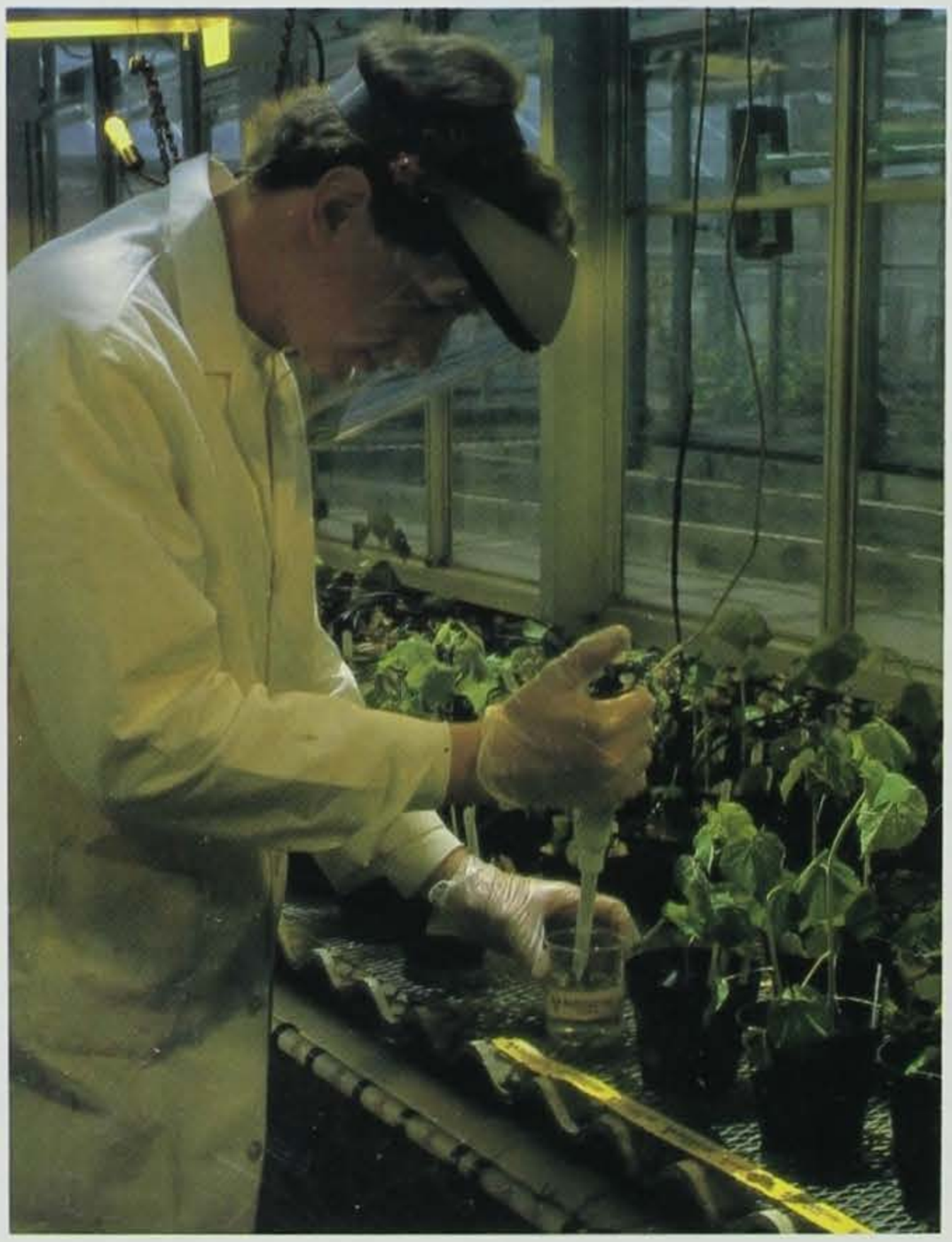
JULY 21-22

Black Hawk Water Carnival. Carnival, street parade, water float, fireworks and 10k run at Black Hawk State Park, Sac County. For more information, contact Dean Hall, Black Hawk State Park, P.O. Box 7, Lake View, Iowa 51450, (712)657-8712.

LOW-LEVEL RADIOACTIVE WASTE

Choices and Responsibilities

Article by Gaye Wiekierak
Photos by Ron Johnson



Few words are as likely to provoke opinion and controversy as *radioactive waste*. Yet because the types of radioactive waste are as varied as the processes that produce them, discussions about this waste are sometimes misleading. Methods to safely manage radioactive waste also vary, depending on the type of waste produced. What is the definition of radioactive waste — particularly low-level radioactive waste?

Low-level radioactive waste is legally defined by what it is *not*. It is *not* uranium or mill tailings (waste from mining and milling), used nuclear reactor fuel rods, by-products of either nuclear weapons production or used fuel processing, or high-level waste from either nuclear reactors or nuclear weapons production. The federal Low-Level Waste Policy Act considers all radioactive wastes that do not fit in these classifications to be low-level radioactive waste.

Low-level waste is potentially harmful if not properly managed, and it needs to be taken seriously. However, unlike high-level waste, low-level waste results from everyday uses of radiological materials by the nuclear power industry, clinics, hospitals, medical research laboratories, universities, pharmaceutical companies and industrial research laboratories. Low-level waste from these sources is generally referred to as "commercial low-level radioactive waste."

The processes that use radiation, and therefore produce commercial low-level radioactive waste, are varied. Some industries producing medical products or food use radiation to kill harmful bacteria. Clinics, hospitals and medical research laboratories use radiation to detect tumors and other diseases, to track and measure medicines and drugs through the body, to sterilize equipment and supplies, and to treat cancer. Some agricultural laboratories use radioactive materials to develop new hybrid crops and fertilizers. Other industries use radiation to

inspect the quality of steel structures and welds and to measure the thickness of materials. Archeologists have successfully used radioisotopes for a number of years, to determine the age of archeological and historical objects.

All of these uses for radiation produce by-products that are no longer usable and must be managed as "waste." These low-level radioactive waste products are diverse. They include contaminated lab vials, sealed radiation sources, protective clothing, hand tools, animal carcasses, test tubes, filter and liquid resins, wiping rags and paper. The management of and responsibility for these wastes has evolved since the 1940s. After World War II, the Atomic Energy Commission maintained control of all radioactive waste management for several years. The first commercial disposal site for low-level waste was established in 1963, and by 1971 there were six sites -- West Valley, New York; Sheffield, Illinois; Maxey Flats, Kentucky; Richland, Washington; Beatty, Nevada; and Barnwell, South Carolina. Three of the sites -- West Valley, Sheffield and Maxey Flats -- were closed because of leaks. Lessons were learned about proper site location and design after the problems occurred at these three sites.

The other three sites -- Richland, Beatty and Barnwell -- have operated successfully. But, the states hosting these sites felt it was not equitable for them to bear the burden of managing wastes from all over the country. They felt the responsibility should be shared by those who produce the waste and benefit from the uses of radioactive materials. In response, Congress passed the Low-Level Radioactive Waste Policy Act in 1980 and Amendments to the Act in 1985. The legislation contains important provisions affecting every state. First, it declares each state is responsible for providing for disposal of the low-level waste generated within its borders. Secondly, states can most effectively meet the responsibility by joining together to form regional compacts. Among other provisions, the law also allows the three states with existing facilities to restrict the waste they accept for disposal and to stop accepting waste from other states completely by January 1, 1993. By that date, a region or state must have its own facility.

What does this mean for Iowa? To meet its obligations, Iowa has joined Indiana, Michigan, Minnesota, Missouri, Ohio and Wisconsin in forming the Midwest Interstate Low-Level Radioactive Waste Compact. Michigan was selected as the host state for the compact's first disposal facility. Michigan is also the largest generator of low-level waste in the seven-state region. The facility is expected to begin operation in 1996 and must operate for 20 years. At that time, another state in the compact will take disposal responsibility. (Between 1993, when present disposal facilities stop accepting waste from other states, and 1996, when the Michigan facility is built, generators of low-level radioactive waste anticipate storing the waste on-site, in accordance with license agreements.)

. . . each state is responsible for providing for disposal of the low-level waste generated within its borders . . . states can most effectively meet the responsiblity by joining together to form regional compacts.

Iowa disposes of 7.4 percent of the volume of radioactive waste generated by the seven states in the Midwest Compact. The map below illustrates Iowa's disposal volume relative to the six other states.

Midwest Interstate Low-Level Radioactive Waste Compact

Percentage of Disposal Volume

28% Michigan *23.3% Ohio* *10.9% Wisconsin* *2% Indiana*

16% Minnesota *12.3% Missouri* *7.4% Iowa*

Source -- EG&G Idaho, Inc. report prepared for the U.S. Department of Energy

A variety of industries use radiation and therefore produce radioactive waste. Most low-level radioactive waste, approximately 87 percent in the Midwest Compact, is Class A and will decay in 50 to 100 years.

The federally defined "class" of waste produced defines the waste's level of risk, and therefore, how the waste is managed. Most low-level waste is Class A, which decays in 50 to 100 years. Class B waste contains more radioactivity and must be disposed of in a form that will secure it for at least 100 years. Class C waste has the most radioactivity of the three classes and takes the longest to decay, possibly more than 500 years. This class of waste requires more stringent disposal and monitoring. It must also be packaged and stabilized separately from the other classes. According to the Michigan Low-Level Radioactive Waste Authority, about 87 percent (by volume) of the Midwest Compact's waste is Class A, approximately 12 percent is Class B and the remaining one percent is Class C.

The federal government is responsible for any waste containing concentrations higher than Class C and any disposal of used fuel from nuclear power plants and waste from nuclear weapons production. The states are responsible for wastes classified as Class C and below.

Iowa and all other states in the Midwest Compact urge generators of low-level radioactive waste to keep the level of waste produced as low as possible. As disposal costs have escalated at staggering rates in recent years, generators also have an economic incentive to produce less waste. Source reduction, volume reduction and liquid waste treatment are encouraged as alternatives. Source reduction is being achieved by industry through improved manufacturing processes and extra care in handling and segregating wastes. Volume reduction techniques involve compaction of such waste items as paper, rags and clothing. Liquid waste treatment includes recycling and cleaning radioactive waste at the plant and using evaporation to reduce the volume and concentrations of radioactive materials in the sludge by-product. Each process reduces potential hazards to workers and the environment.

Valuable lessons have been learned from the experiences at the three sites that developed problems and closed. New licensing standards have been improved requiring more thorough performance evaluations of sites. It was also determined that waste exceeding Class C cannot be sent to any commercial disposal sites. New waste packaging and segregation requirements were designed to increase the stability of facilities. The experiences with the closed sites also showed the importance of continuous monitoring. Finally, most states and compacts, including the Midwest Compact, have determined that shallow-land burial of low-level radioactive waste is not recommended. Instead, the compact prefers engineered structures with multiple barriers for additional protection.

As long as there are uses for radiation — from agriculture to x-rays — debates about the relative benefits and drawbacks associated with these uses will continue. Technological and societal choices will continue to be made as the pros and cons are weighed. The responsibility to safely manage radioactive waste will continue to accompany each choice that is made.

Gaye Wiekierak is a program planner for the department's Waste Management Authority Division in Des Moines.

The Hows and Whys of COMPOSTING

JULIE SPARKS

Under the Waste Reduction and Recycling Act passed by the Iowa Legislature in 1989, beginning January 1991 Iowans will no longer be able to dispose of yard wastes in landfills.

Composting is a method of turning yard, garden and kitchen waste into humus or compost — a partially decayed form of organic matter that, when added to soil, improves its texture and quality. Although it has some nutrient value, compost is not a fertilizer, rather it is a soil enhancer, and a major ingredient in any good gardening operation. Composted organic matter improves the physical structure, water-holding capacity and aeration of even the poorest soil -- clay or sand. Consequently, humus aids plants in the retention and uptake of existing or recently added nutrients.

The basic concept of composting is to let bacteria and fungi go to work breaking down organic materials -- grass clippings, leaves, food scraps -- simulating and accelerating the decomposition process found in nature. Heat is generated during the process and the temperature inside a compost pile can reach 150° to 170°F. From raw materials to a workable product, backyard composting takes anywhere from two weeks to several months, depending on the amout of material and methods used. And the resulting pile of humus is about 30 percent of the original plant materials' volume.

Decomposition in the compost pile is generally an aerobic process requiring oxygen. The microorganisms doing the decomposing need the oxygen as well as moisture -- two items lacking in modern, properly constructed landfills.

Compost is particularly valuable to the avid gardener, but whether you are a professional landscaper, a weekend gardener or simply have a roomfull of house plants to tend, most homeowners can benefit from composting. Its easy, inexpensive, saves landfill space and produces a valuable product.

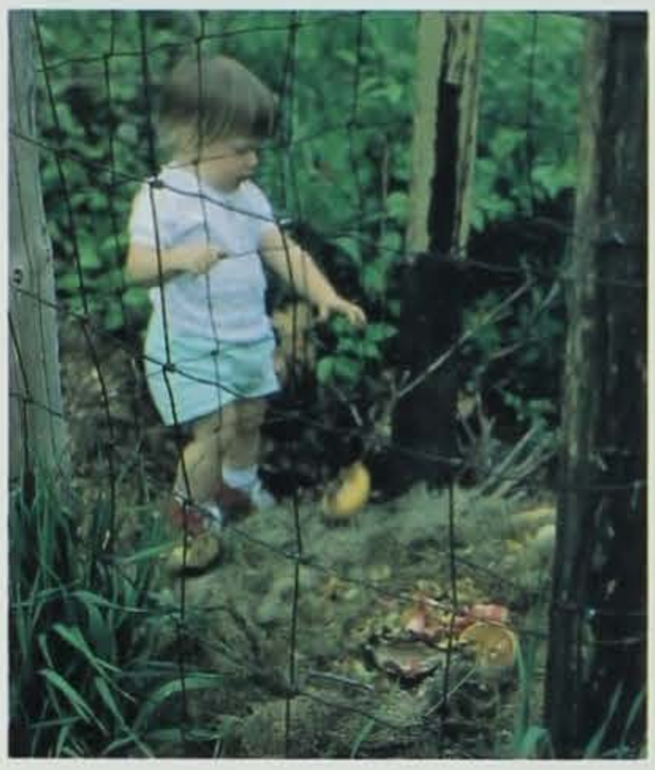
by Julie Sparks

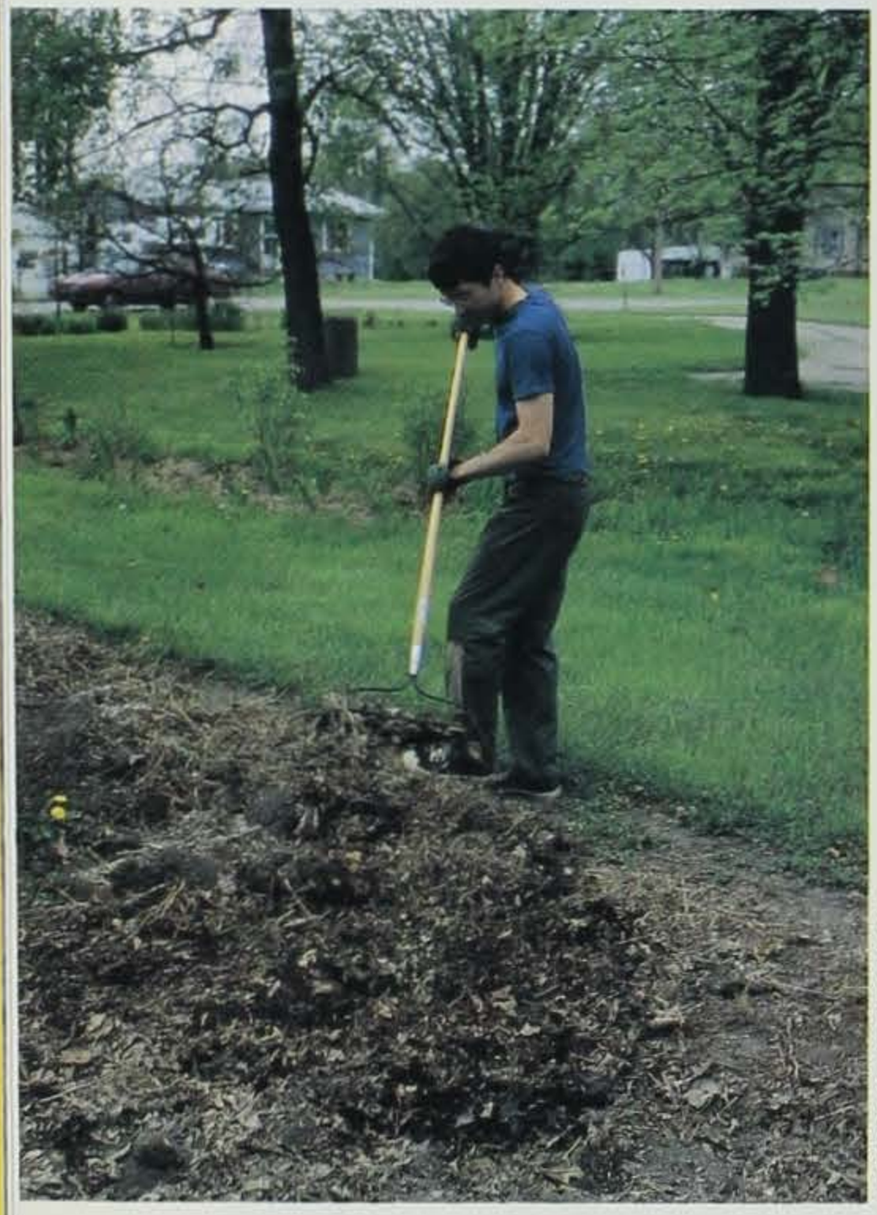
Backyard Composting

For the individual homeowner, composting may be the most rewarding of all recycling efforts because of the volume of waste it saves from the landfill. Each year the average Iowa household produces approximately a half a ton of yard waste, including grass clippings, leaves, weeds, old mulch and twigs. Add to this, table scraps, sawdust, small pieces of paper and other organic matter, and nearly 30 percent of the trash thrown out by Iowans could be saved for a compost pile.

Creating and maintaining a compost pile is an easy task. Although a bin is not necessary, containing the pile in an enclosure will make it easier to manage. A bin can be very simple or quite elaborate. Large mounted tumbling bins found in some garden catalogues can cost several hundred dollars. Local lawn and garden shops, anticipating the need, are now offering composting "kits." But the backyard do-it-yourselfer can make an inexpensive, efficient enclosure from chicken wire and a couple of wood or metal posts. A piece of old snow fence, cinder blocks or woven wire are good materials as well — holding the waste, yet allowing for air circulation. All can easily be fashioned into circular or rectangular bins.

An ideal height for the compost





PHOTOS BY JULIE SPARKS

Backyard composting can be a very simple way of reducing waste at the source -- the first choice in solving landfill problems. A handful of finished compost (upper right) has on earthy smell and is essential in producing good-quality soil.

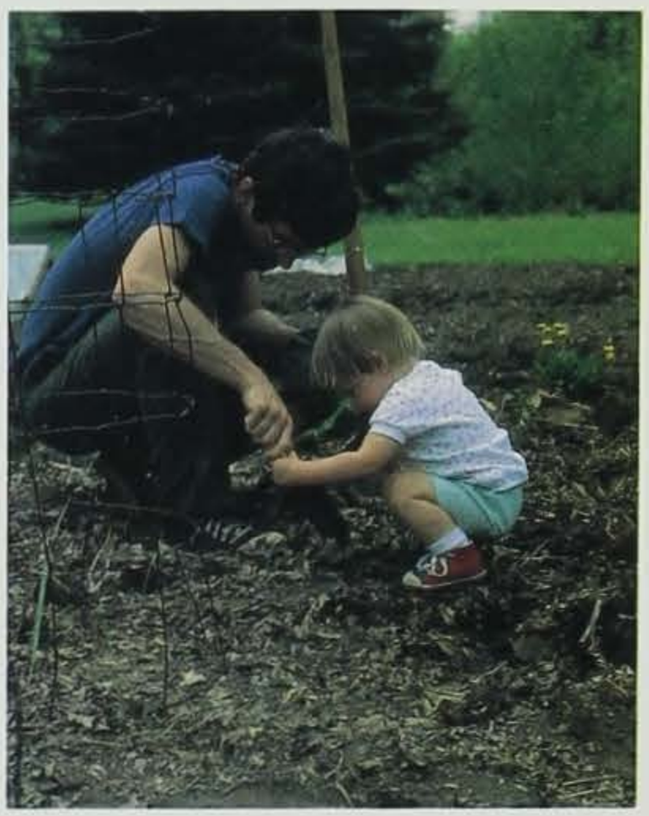
pile is between three and four feet tall. A pile smaller than three feet will lose too much heat and a taller one will pack the material, reducing aeration and thus interferring with the decomposition process. Length and width can vary depending on the amount of waste generated and your ability to handle the pile. The enclosure can be divided to give two sections — one side for the completed compost and the other for material in the process of decomposing.

A divided bin can make turning or "working" the pile easier, as well. Occasionally turning the pile over aerates the materials — providing necessary oxygen to the microorganisms. Steam rising from a freshly turned pile is a sign the process is working. Frequent turning of the pile helps to speed up decomposition, combat odor and insures the materials decompose evenly.

It is important to consider the location of the bin. It should be placed in an out-of-the-way spot, screened from view, but accessible to water. Growing flowers or shrubs around the bin can help conceal the area; however, the location should not be shaded. Partial shade will retard drying, but may also lower the temperature of the pile in cooler months, causing a slower decomposition rate.

The pile should be kept moist but not soggy. Horticulturalist say the heap of organic matter should be kept about as moist as a damp sponge. A slight depression in the top of the pile will help collect rain water during a dry spell and conversely a slightly rounded top on a pile will help shed excess water during wet conditions. During prolonged periods of rain, however, the pile should be covered with a tarp.

RON JOHNSON



What you put in your compost pile will depend on the organic materials available to you. However, it should not become a trash pile. Diseased plants should be kept out. Avoid meats and fats, they will attract animals. And table scraps should be covered with leaves or grass clippings to eliminate flies. Large sticks and branches or hard, fiberous materials should be left out unless they can be ground up or chopped before adding them to the pile. Shredding, chopping and grinding plant materials increases the surface area for the microorganisms to work on and therefore speeds up the decomposition process.

Adding nitrogen to the plant materials will feed and increase the number of bacteria that breakdown the organic matter, resulting in faster decomposition. Barnyard manure, cat and dog droppings,

blood meal and commercial fertilizers are good sources of nitrogen.

Best results are obtained when the compost materials are layered. A few inches of sawdust for absorption or a layer of course plant materials, which allow air circulation, is recommended for the bottom of the pile. Six to eight inches of basic plant materials make up the first layer, followed by a sprinkling of nitrogen. A thin layer of garden loam or good soil and a couple shovels of coarse sand should be placed on top. Continue this layering process until the pile is about three to four feet high. Because of the remarkable ability of soil to absorb odors, there will be no disagreeable odor around a compost pile that has been layered with soil.

Compost is ready to use when the pile no longer gives off heat or odor when worked The material will be brown and crumbly with an earthy smell. A small amount -- about a heaping handful per square foot -- added to flower beds, gardens and even potted house plants, will greatly improve the condition of the soil.

By setting up a backyard composting operation you are reducing waste at the source. This is the first choice in the hierarchy of solutions to the waste reduction problems. But are there any other options?

Municipal Composting

In January 1991 Iowans will no longer be able to send yard wastes to the landfills. Because many Iowans will not do their own composting, the Department of Natural Resources and municipalities around the state are gearing up for the resulting situation.

Because composting is new to virtually all Iowa solid waste disposal programs, the DNR's Waste Management Authority Division has set up pilot projects. Grant projects have been funded in several Iowa cities to develop composting technologies. The City of Dubuque, from July 1, 1990, to June 30, 1991, will conduct a yard and leaf waste collection using biodegradable bags. Experimental *windrows* will be constructed of shredded waste and bags. Samples of the decomposing material will be taken throughout the year to determine the degradability of the plastic bags. Two similar, smaller scale projects will be conducted during the same time period in the cities of Grinnell and Carroll. Scott County and the cities of Sioux City, Postville, Keokuk/Fort Madison are currently operating grant-funded composting projects.

RON JOHNSON

RON JOHNSON

A freshly turned pile of yard waste at a Davenport composting operation (above) produces steam. Scott County is currently composting yard wastes by mixing them with sewage sludge from Davenport. A windrow method of composting is used -- elongated piles of plant materials are turned weekly by machine (top).

In addition to these pilot projects, the DNR will be publishing a composting guide for local governments, instructing municipalities on setting up their own operations. The booklet is scheduled for distribution later this summer.

The general principles of city composting operations are much the same as backyard composting, only on a much larger scale. Site selection, site preparation, composting methods, odor control and temperature and moisture maintainence are considerations in both. And the end result is still the same -- reduction in waste going to the landfill and a valuable end product -- compost.